

The Political Economy of Commodity Export Policy

A Case Study of India

Masanori Kondo

Trade liberalization programs often fail because they neglect domestic political realities. Wise policy reform helps interest groups focus on efficient, productive activities by transforming one group into another and by enhancing politically desirable alliances among groups.



Summary findings

Many developing country governments discriminate against sectors that export primary commodities. India, for example, discriminates against cotton production. Exports of cotton have been restricted by quotas, and the mill industry has been subject to such regulations as the obligation to supply hank yarn for Indian handlooms.

These interventions have led to stagnating cotton yields, rent-seeking activities, manipulation of cotton statistics, and low profitability in cotton mills' offsetting the short-run benefits of inexpensive cotton in India.

Kondo develops a numerical model to measure the impact of liberalizing cotton exports. This is the first simulation model of its type, and the first multimarket model that computes price elasticities endogenously, based on the ratios between product prices and input costs. The model distinguishes short-run from long-run effects by drawing on the principle that the cost of capital varies only in the long run.

Results of the simulation under complete liberalization indicate heavy (16 percent) net losses in income in the handloom sector. The government subsidies needed to compensate for those losses amount to US\$423 million,

or about 25 percent more than current government revenue in India's cotton sector.

Such costly subsidy of handlooms is undesirable not only budgetarily but also politically, because it creates new vested interests.

Kondo proposes politically feasible programs for managing the adverse impact of liberalization on the handloom sector, including handloom conversion and involvement of mills in cotton cultivation.

Governments tend to prefer an export quota to an export tax because it is easier to change a quota than a tax rate if market conditions change. But flexible controls actually facilitate rent-seeking activities. As quotas are changed more often than tax rates, more interest groups get involved in lobbying and in padding crop estimates.

In other words, the political and economic problems that result from restrictions on commodity exports can be more serious than those relating to resource misallocation. It is important to consider how policy changes will affect the political power structure and the objectives of different interest groups.

This paper—a product of the Rural Development Sector Unit, South Asia Region—is part of a larger effort in the region to enhance rural development in India. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Dina Umali-Deininger, room MC10-159, telephone 202-473-0419, fax 202-522-2420, email address dumali@worldbank.org. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The author may be contacted at masanori@icu.ac.jp. December 2001. (62 pages)

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ACRONYMS AND ABBREVIATIONS

AICOTTON	All-India Cotton Growers Federation
ATIRA	Ahmedabad Textile Industry's Research Association
ATMA	Ahmedabad Textile Mills Association
CCI	Cotton Corporation of India
EICA	East India Cotton Association
EOU	Export-Oriented Unit
EPCG	Export Promotion Capital Goods (Scheme)
GOI	Government of India
GUJCOT	Gujarat State Co-operative Cotton Marketing Federation
ICAC	International Cotton Advisory Committee
ICRA	Investment Information and Credit Rating Agency of India
ICMF	Indian Cotton Mills Federation
IIM	Indian Institute of Management
IRMA	Institute of Rural Management, Ahmedabad
ITMF	International Textile Manufacturers Federation
MFA	Multi-Fibre Arrangement
MAFED	Maharashtra State Cotton Growers Co-operative Marketing Federation
NCAER	National Council for Applied Economic Research
NTC	National Textile Corporation
RBI	Reserve Bank of India
SICA	South India Cotton Association
SIMA	Southern India Mills Association
SITRA	South India Textile Research Association
TEXPROCIL	Cotton Textiles Export Promotion Council of India

CHAPTER 1

INTRODUCTION

Sectors that export primary commodities have been discriminated against by the governments of many developing countries. Even though economic theory teaches us that such trade intervention is generally not the best solution even in the presence of domestic market distortion, the restriction of agricultural commodity exports by quota tends to be preferred by the policymakers. In many cases, this is because of domestic political economy considerations. The cotton production sector in India is a prime example. The prime motivation of this case study is to investigate the crucial political factors behind the second-best trade intervention in the context of the Indian cotton economy.

Cotton export has been restricted by the Indian government for many years. Despite the substantial degree of economic liberalization since 1991, the government has not considered changing the policy, and as a result, India is far from being a major exporter in the world cotton market (**Table 1**). Considering one fourth of the world's cotton-cultivated land acreage is in India and one eighth of the world's cotton is produced in the country, the market share is extremely small.

Table 1: World Cotton Export Market (million tons)

Country	Exports	
United States	1,589	(26.8)
Uzbekistan	1,150	(19.4)
Tadzhikistan	360	(6.1)
Turkey	280	(4.7)
Greece	175	(3.0)
China	150	(2.5)
Egypt	94	(1.6)
Pakistan	20	(0.3)
India	18	(0.3)
World Total	5,927	(100.0)

() : percentage shares in the world market

Sources: Office of the Textile Commissioner (1995), ICAC (1994)

The export restriction on cotton has resulted in a number of negative consequences. The yield growth of cotton has stagnated as the price of cotton is suppressed, thus it is not an attractive crop for farmers. Inefficient public traders have lost export opportunities and waste cotton while lobbying the government to allocate them higher export quotas. The spinning industry and weaving industry continually ask the government to restrict the level of cotton exports. In addition, the nationwide cotton export quota is decided in an unscientific way based upon crop estimates made by interest groups, who tend to pad the estimations up in order to influence the level of nationwide cotton export quotas. The Indian spinning industry, which was one of the most competitive in the world in the eighteenth century, has now become one of the world's most inefficient. In fact, India has become one of the few countries where the production of cotton yarn per spindle has declined since the 1960s. Moreover, the export restriction of cotton did not contribute to an increase in cotton yarn and textile exports. Despite the abundant supply of cotton for the domestic cotton textile industry, India's share in the cotton yarn and cloth markets in the world is also limited (Table 2).

Table 2: India's Share and Ranking in the World Cotton and Textile Markets

	Area, Capacity	Production	Exports
Cotton	24 % (1)	13 % (3)	1 %
Cotton Yarn	17 % (2)	9 % (3)	2 %
Cotton Cloth	19 % (3)	14 % (2)	3 %

() : India's ranking in the world

Sources: Office of the Textile Commissioner (1995), ICAC (1994)

In the past, there have been a number of attempts to incorporate political issues into economic theory.¹ More recently, several important empirical studies were conducted on the political economy of agricultural trade policy in developing countries.² In addition, a theoretical attempt was made to fill the gap between international economics and domestic politics by modeling the mechanism whereby interest groups

¹ Buchanan and Tullock (1962) and Olson (1971) are classic literature which incorporated politics into economic theory. Krueger (1974)'s model of "rent-seeking activities" and Bhagwati (1982)'s work on "directly unproductive profit-seeking (DUP) activities" illustrate how the regulation induces socially undesirable activities.

² Krueger, Schiff and Valdes(1995) studied the agricultural pricing policies in eighteen countries, and concluded that discriminating against exporting agriculture causes a number of negative effects. The cross-country study by Sachs and Warner (1995) revealed a negative relationship between resource abundance and economic growth. Bates (1981, 1983) studied several African countries, and concluded that the negative consequence of export restrictions of natural resources in Africa was largely a result of the governments' intention to use the economic rent not for irrigation or infrastructure but for "divisible inputs" to some particular politically influential groups.

can buy policies by offering contributions contingent on the import protection policies formulated by the government.³ However, there have been no empirical studies to examine the export restriction policy from a political-economic perspective in the Indian cotton sector.

The paper attempts to answer a number of questions, which can be organized into the following three categories:

- (i) The background and framework of cotton export policy - what is the background of the cotton export policy in India; how is the cotton export quota for each exporter decided; what objectives do interest groups have; and how do they influence the cotton export policy.
- (ii) The consequence of export restriction policy - how scientifically and consistently has the export quota been decided by the government; who has captured the economic rent; what are the impacts of the export policy on the domestic market; and what is the reputation of India as a cotton exporter in the world market.
- (iii) Political feasibility of reforms - who will gain and who will lose under liberalization; how politically feasible is the liberalization; and what is a politically feasible compensation scheme for losing groups.

Based on the answers to all these questions, this paper will argue that if we take the exporting country's domestic politics into account, an export restriction by quota may even be more harmful to the country than it has generally been thought, because it can induce a vicious circle of political-economic problems and an even more distorted future policy. Moreover, once the interest groups are formulated, it is not easy to carry out future liberalization. The planners in India's other sectors and in other countries can share the lessons learned from the Indian case if they apply similar logic - how do the interest groups interact with each other to influence the export quota policy, and how does that distort the political decision on export policy - to their own sectors. This will be the major contribution of this paper.

The rest of this paper is organized as follows: Chapter 2 discusses the background of cotton export policy in India. The interest groups over cotton exports and their objectives are identified. Chapter 3 analyzes all the negative consequences of the cotton export restriction by quota. Chapter 4 measures the expected level of the income gains and losses under economic liberalization on a computer simulation model. Chapter 5 discusses the feasibility of implementing the liberalization policies, and identifies several desirable policy options. Lastly, Chapter 6 draws generalized lessons and implications.

³ Grossman and Helpman (1994) is one of the pioneer works in the field. Helpman (1995) reviews several theoretical ways to incorporate political factors into international economics.

CHAPTER 2

THE COTTON EXPORT POLICY IN INDIA

2.1. BACKGROUND OF THE GOVERNMENT POLICY

Government's Desire for Industrialization

The cotton textile industry has been one of the most important industries in India. When India became independent in 1947, the cotton textile industry was the single most important industry in the country. As a result of the partition of India and Pakistan, India lost its major cotton belt while retaining the country's major textile centers. Since the early 1950s, an import substitution strategy has been implemented in line with the Mahalanobis Model, in which planners hoped that after a certain protection period, the protected industry would become internationally competitive.

As cotton production in India gradually increased, India became an exporter of cotton. Since more than half of the production cost of cotton yarn is cotton, Indian planners thought that providing inexpensive cotton to the domestic spinning industry by restricting exports would eventually allow it to develop. Similarly, it was thought that restricting cotton yarn exports would develop the downstream cotton weaving industry in the long-run. Because of its intention to control the market in a more direct and flexible way, the government chose the export quota scheme rather than export taxation to increase the supply of inexpensive cotton to domestic spinning mills, and, hence cotton yarn to weavers. Politically, the government's desire to develop the textile industry at that time was strongly supported by influential business groups.

Income Distribution

The discrimination against the cotton production sector and cotton spinning sector as opposed to the downstream handloom sector was justified by the government not only for their desire for self-independence and industrial development but also for income distribution. The process of manufacturing cotton textiles is broadly divided into three stages - cotton production, cotton spinning and weaving. Raw cotton, which farmers grow, is ginned and processed, and sold to mills by traders. Mills spin yarn from cotton, and then weavers manufacture cotton textiles. In the case of India, most cotton spinning mills are large-scale units in public and private sectors, while the weaving industry consists of three major sectors - composite mills, powerlooms and handlooms. While composite mills are large-scale and mostly run by the public sector,

both powerlooms and handlooms are small-scale private sector enterprises. Handloom weavers use the most primitive technology. Cotton yarn is either sold to powerlooms and handlooms weavers or woven by composite mills themselves. The handloom workers, who are the largest group in terms of employment in the whole textile sector, are the poorest, even more impoverished than poor cotton farmers in India. In the past, several surveys have revealed the remarkable income difference between mill workers and handloom workers (**Table 3**).

Table 3: Average Daily Wage Comparison Among Sectors

Year	Survey	Composite Mill	Powerloom	Handloom
1988	Goswami	Rs.75	Rs.40	-
1985	ATIRA	Rs.50	Rs.10 - 25	-
1990	GOI	Rs.50	Rs.25	Rs.10 - 15
1982	SITRA	-	Rs.12.5	Rs.9.5

Sources: Goswami (1990), Uchikawa (1998) etc.

Compromise to Cotton Farmers

While the cotton textile industry is the largest manufacturing sector in terms of employment in India, cotton is the most important commercial crop in India's agriculture in terms of cultivated area. Therefore, while suppressing cotton prices by restricting exports, the government has also needed to satisfy farmers. In the past, the government has provided them a number of benefits, such as income tax exemption, concessional power rates, and fertilizer subsidies. Particularly, the fertilizer subsidization policy has been used as an important tool to satisfy politically influential wealthy farmers, as they have had more access to these subsidized fertilizers. Another way to keep cotton farmers content was to allocate most of the cotton export quotas to the public cotton traders who rebate their economic rents to cotton farmers in various ways such as by providing them high-quality cotton seeds.

2.2. COTTON EXPORT RESTRICTION SCHEME

Roles of the Textile Commissioner and the Cotton Advisory Board

India's cotton exports are handled by their Ministry of Textiles. Every year, the Textile Commissioner recommends an export quota to the Minister of Textiles, based on crop estimates made by the Cotton Advisory Board which is a representative body of the government, cotton growers, traders, and spinning and

weaving industries. The Cotton Advisory Board's role is to estimate the supply, demand and opening stock of cotton crops every year. The members include the Textile Commissioner as chairman, several joint secretaries of the Ministry of Textiles and of the Ministry of Agriculture, state government officials in charge of agriculture, and other organizations representing all the sectors that are involved in cotton trading either directly or indirectly.

As far as cotton trading is concerned, the role of the Ministry of Agriculture is limited to suggesting the minimum support price that cotton farmers are guaranteed to receive. The Commission for Agriculture Costs and Prices records the prices of basic cotton varieties every year. If the market price of cotton is below the minimum support price, the Cotton Corporation of India (CCI) must enter the cotton market to purchase cotton in the domestic cotton market. However, in practice, the minimum support price has been set so low - usually less than 70 per cent of the quoted market price - that it has been touched only once in the past twenty five years.

Methods of Crop Estimation

The members of the Cotton Advisory Board are called to a meeting by the Textile Commissioner several times a year in order to estimate the situation of the current cotton crops. Each member has a different estimation method. On the supply side, for example, state government officials visit the cotton fields of their state; the Ministry of Agriculture (central government) makes the statistical assessment on nationwide area and yield; the East India Cotton Association (EICA) observes how much cotton is ginned; and the CCI looks at the arrival of cotton in the market. On the demand side, each member estimates how much cotton will be consumed by domestic mills. Individual mills file statements every month to the Textile Commissioner reporting how much cotton they are using. Cotton consumption by small-scale mills is estimated based on the number of their spindles. Although the initial estimations by members differ from each other, consensus is made for one final estimate in the meeting. The Textile Commissioner reports the final estimate of surplus cotton to the Minister of Textiles. Based on his recommendation, the Minister of Textiles declares the nationwide quota level, which is divided into sub-quotas for different varieties of cotton.

Although the nationwide quota announcement is made once a year, the quota is allocated little by little to each trader several times a year, depending on the fluctuating cotton market situation. In other words, the level of allocated export quota is subject to change throughout the year. Therefore, if the cotton scenario becomes tight at some stage during the year, it is possible that not all the export quotas for all the varieties of cotton announced in the beginning of the year are actually allocated by the end of that year. No

cotton export quota is auctioned, except for the low quality unspinnable *deshi* cotton, which is left in the open bidding market. Any traders can export *deshi* cotton if they want.

Quota Allocation Performance

Public traders are allocated most of the cotton export quota every year. Usually, the CCI, a central government agency, is allocated the largest portion of the cotton export quota, followed by the Maharashtra State Cotton Growers Co-operative Marketing Federation (MAFED), the Gujarat State Co-operative Cotton Marketing Federation (GUJCOT), and other state marketing federations (**Table 4**). Although cotton situations change every year, the export quota for spinnable cotton is not allocated to private traders even when cotton harvest is exceptionally good. As a result, private cotton exporters specialize in unspinnable *deshi* cotton, which is not so profitable for exporters compared to other varieties of cotton. There are two major reasons why the government prefers public traders to export cotton. First, the government believes that it is good for farmers, because the export rents captured by public traders can be rebated to farmers by supplying them with better cotton seeds and by R&D activities. Second, the government is afraid that some private traders may manipulate the export transactions and cause capital outflows.

Table 4: Market Share of Cotton Traders by Ownership

Type of Trader	Share in Domestic Cotton Market	Typical Share in Export Market
CCI (central government agency)	8 %	25 %
State marketing federations	17 - 22 %	50 %
Private traders	70 - 75 %	25 %*
Total	100 %	100 %

* Mostly *deshi* cotton.

Sources: EICA (1995) and Lal & Parmer (1995) etc.

Incentives to Export Cotton

There are a number of factors that make exporting spinnable cotton very attractive for traders. The most obvious incentive is the difference in price between the Indian market and the world market. In the past few years, the difference between nominal domestic cotton prices and export prices has been around 15 per cent (Pursell and Gupta, 1996). Compared to this, the margin left for traders after deducting sales tax and transportation costs is only about 0.5 per cent in the domestic cotton market. This difference between the export market and domestic market is much narrower for unspinnable *deshi* cotton, which private traders

can export through open bidding.

In addition to the nominal price difference, there are several other advantages in exporting spinnable cotton. The first important factor is credit risk. Due to the poor financial situation of many domestic cotton spinning mills, credit-based sales to them are considered to be fairly risky in India. Compared to this high risk in selling domestically, exporting cotton is considered much safer because payment is guaranteed by banks in the importing countries. Another important factor that makes exporting cotton attractive is India's tax structure. All profit made by exporting any commodity, including cotton, is exempted from income tax in the country. Moreover, cotton exporters can earn foreign exchange, which was especially attractive before the major depreciation of the Rupee in 1991. It has often been alleged that some private traders (mostly small-scale ones) have tried to convert the foreign currencies that they illegally earn to Indian Rupees by over-invoicing their cotton export transactions.

2.3. INTEREST GROUPS AND THEIR POLITICAL ACTIVITIES

Various Interest Groups

There are a number of interest groups that are competing with each other for cotton exports in India. Major interest groups competing for the cotton and yarn export policy in India can be classified as: cotton farmers, public cotton traders (the CCI and state marketing federations such as the MAFED and the GUJCOT), private cotton traders, organized sector mills (owners of spinning mills, owners of composite mills, and mill workers who have conflicting interests with each other), powerlooms, handlooms (master weavers and dependent weavers), and bureaucrats. The khadi sector (hand spinning sector) and co-operative spinning mills are excluded from the analysis, because their production shares (and political voices) are negligible.

Generally speaking, cotton growers and traders want cotton to be exported, while cotton spinning mills, powerlooms and handlooms do not. Further, cotton spinning mills and weavers, who share interests in cotton exports, have conflicting views regarding cotton yarn exports; the former want cotton yarn to be exported, while the latter do not. As described below, all of them lobby the government in a different way, and the role of the government has been to balance the different interest groups rather than to find the economically appropriate level of cotton exports.

Cotton Farmers

The political power of cotton farmers is quite important in India. Behind their strong political presence,

there are a large number of very well-organized votes. As the number of households who cultivate cotton is around 5 million, the total number of the cotton farmers' votes is estimated to be around 10 million, out of the total estimated votes of 25 to 30 million in the whole cotton sector in India. The voices of the cotton ginning and processing industry, which is reserved for small-scale mills, are also represented by influential cotton growers and local traders.

Cotton farmers are politically even more influential in the states where the economies are more dependent on cotton. In particular, politics in the states of Maharashtra and Gujarat are very sensitive to cotton interests. For example, the Maharashtra Cotton Monopoly Procurement Scheme was approved in 1971 as a result of the strong political presence of cotton farmers in the state. Under the democratic federal political system in India, one of the most important tasks of the Members of the Parliament elected in these states is to negotiate cotton issues, including the export quota allocation, with the central government.

Public Cotton Traders

By and large, the political interest of public cotton traders over cotton exports is similar to that of cotton farmers. Both of them want more cotton to be exported. Each state marketing federation represents the interest of the farmers who belong to the federation, and pressure the central government for more quota allocation. Thus, state marketing federations compete with each other over cotton export quotas on behalf of their farmer members.

In order to increase the export quota allocated to them, state marketing federations write letters and send delegations to the central government. For example, it is reported that the GUJCOT sends twenty to thirty delegates to Delhi once every three to four months. In addition, upon its request, the Gujarat State Minister lobbies the central government for more cotton exports. The MAFED has the extra objective of ensuring the central government approves the continuation of the state cotton monopoly scheme in Maharashtra. All the state marketing federations belong to one nationwide umbrella organization, the AICOTTON, which pressures the government to increase the nationwide cotton export quota. The CCI also lobbies the central government, the owner of the corporation, for more cotton export quota allocation.

Private Cotton Traders

Unlike the public cotton traders, the political presence of private cotton traders is negligible. Although there are many private cotton traders, most of them are small in size, and politically they are not as organized as public traders. Their lobbying activities are represented by cotton associations such as the East India Cotton Association (EICA) and the South India Cotton Association (SICA). The EICA is the largest nationwide

association, whose members include private as well as public buyers, sellers, brokers, and exporters of cotton. The SICA is a similar association in southern India. Although both private and public cotton traders are members of the associations, the EICA and the SICA tend to represent more the interest of private traders.

Between the public cotton traders and private traders, there are similarities and differences in terms of political interest. Public and private traders share a common interest in relaxing the cotton export quota, which will raise domestic cotton prices. Also, even though most of the quota for spinnable cotton is allocated to public traders, there is room for private traders to earn commissions by acting as middlemen. Therefore, relaxation of the cotton export quota means more profit for both public and private traders. However, regarding the full liberalization of cotton exports and the total removal of the existing export quota scheme, public traders and private traders have conflicting interests. Public traders prefer the existing quota allocation scheme, because it enables them to easily capture the economic rents accrued from the price difference between the domestic and world markets. Conversely, private traders want full export liberalization by removing the export quota scheme because they could then export not only *deshi* cotton but also much more spinnable cotton.

Mill Sector

Among all the interest groups in the cotton sector, the cotton mill sector is one of the most well-organized. The Indian Cotton Mills Federation (ICMF) is a powerful organization that represents the interests of the owners of cotton spinning and weaving mills, and under the ICMF, there are eleven state-level cotton mill associations, such as the Ahmedabad Textile Mills Association (ATMA), the Bombay Millowners Association, and the Southern India Mills Association (SIMA). Especially when cotton prices are going up, these cotton mills' associations appeal to the central government not to export cotton. In order to justify their objective to block cotton exports, they also publicize in newspapers and other journals official statements that India should export not cotton but value-added textile products. In fact, many Indian newspapers and journals (such as the Economic Times, Tecoya, Express Textile) are full of these kinds of statements especially when the price of cotton is increasing.

However, the lobbying power of the organized mill sector has been declining relative to other sectors. There are three main reasons for this. First, the cotton textile business is no longer a flagship business for most large private business groups. Although many Indian business groups originally started from the cotton spinning and weaving business, most of them have diversified their business activities to other protected and hence more profitable industries such as the chemical industry and man-made yarn industry. Consequently,

the cotton spinning industry has become relatively much less important for them, which has weakened the lobbying power of the ICMF, as the federation is not backed up by these influential business groups as strongly as before. Secondly, not only for business groups but also from the central government's point of view, the cotton mill sector is becoming relatively less important, because many other manufacturing industries such as automobiles and electronics are picking up as a result of economic liberalization. The third factor is conflicts of interests between western mills and southern mills, which is analyzed later in this section.

What is worse for mill owners is that they do not get political support from mill workers. Indian mill workers are known for their very effective political activities. They belong to labor unions, which lobby for their job security, higher wages, better working conditions, better pension and compensation programs, by organizing labor strikes, sending delegations to Delhi, and asking local politicians to write letters to the government on their behalf. Their attitude against the modernization of mill plants sharply conflicts with that of mill owners. In the past, as a result of the workers' successful political activities, an agreement was made at the Indian Labor Conference that prohibits retrenchment of existing workers as a result of modernization. The workers have little interest in the level of cotton and cotton yarn exports. Although mill workers would receive higher wages in the long-run if less cotton and more cotton yarn were exported, this is too indirect and is not the workers' concern. Like cotton farmers, the mill workers tend to be short-sighted.

Regulations in the Mill Sector

As the prime role of the domestic spinning mills is to provide inexpensive cotton yarn to the downstream weavers, the Indian government has forced a number of regulations in the mill industry. First, the export ceiling⁴ is fixed such that cotton cone yarn exports of 1 to 40 counts, and exports of hank yarn up to 60 counts, which account for a quarter of the total cotton yarn production, is totally prohibited. Unlike cotton, for which the quota allocation to each exporter is announced by the Minister of Textiles, the cotton yarn export entitlements are distributed by the Cotton Textiles Export Promotion Council of India (TEXPROCIL) after the total nationwide export ceiling is announced by the Minister of Textiles.

Second, the hank yarn obligation has been enforced, whereby spinning mills have to reel half of their domestic cotton yarn supply as hank yarn, which is for handlooms. Only cotton yarn for export is free from the 50 per cent obligation. Although cone yarn and hank yarn are basically the same kind of cotton

⁴ In order to distinguish from the import quota enforced by trade partners, export quota for cotton yarn is referred to as an export "ceiling", in contrast to a cotton export "quota".

yarn, hank yarn is wound more loosely in a shape suitable for handloom weaving. While the cost of producing hank yarn exceeds that of cone yarn (Bhattacharya, 1995), the selling price of hank yarn tends to be lower than that of the cone yarn from lower counts to higher counts. Hence, the hank yarn obligation has forced spinning mills to lose profits.

Composite mills, which produce not only yarn but also cloth, have been forced to operate in an even worse business environment than spinning mills, because of government regulations to protect the handloom industry from competition in the domestic cloth market. These regulations include restrictions on loomage expansion, restrictions on processing man-made yarn, and higher rates of tax on mill-made cloth compared to cloth woven by the small-scale weavers. As a result, the powerloom sector has emerged as the largest cotton cloth supplier, while the regulations have put the composite sector at a serious disadvantage in competition with powerlooms.

Lastly, the protection of the domestic textile machinery industry should be taken into account. After independence, textile machinery imports were practically not allowed in India for many years, as part of the Mahalanobis strategy, which promoted import substitution industrialization, not only in the consumer goods industry but also in the intermediate goods industry and the capital goods industry. For a long period, the import duty on textile machinery for non-export-oriented mills was high at 60 to 70 per cent. It is only recently that the government started to apply concessional import duty rates for exporting mills in line with economic liberalization. The rate of import duty for normal mills catering to the domestic market, which account for the majority of the mill sector, is still as high as 37.5 per cent.

Powerloom Sector

The powerloom sector is informal, flexible, small-scale and labor intensive. Although a few powerloom units are operated by household labor like most handloom weavers, most powerlooms are operated by hired workers with the members of the owner's family occasionally participating in the weaving process. Powerloom workers tend to shift from unit to unit in response to even slightly higher wages.⁵ Most of them have no job security and no compensation packages, because their employment is not covered by the Factory Law in India. The Hussain Committee has emphasized the need to improve their working conditions (Ministry of Textiles, 1990).

Although powerlooms, like mills, are hit when cotton prices rise, their lobbying is not effective. There are some associations that represent the interests of powerlooms, such as the nationwide All-India

⁵ According to the Labour Bureau, about two thirds of the Indian powerloom workers worked on a temporary basis in 1988.

Powerloom Federation, which represents roughly 1.2 million powerloom units employing 6.6 million workers all over the country, and the Maharashtra State Powerloom Association and the Tamil Nadu Powerloom Federation. Although these federations announce their opposition to cotton exports and cotton yarn exports on account that their textile exports are based on the inexpensive supply of cotton yarn, they are not nearly as well-organized as the associations of farmers or mills. Olson (1971)'s proposition - the smaller the number of members, the more well-organized the group is - holds here.

However, despite its weak lobbying power, the powerloom sector has grown rapidly as the single largest beneficiary of the government policy. This is largely because of the government policy that mistakenly treated powerlooms and handlooms together as the decentralized sector. In order to enjoy the special privileges that the government intended for handlooms, some larger-scale powerloom units have been camouflaged to appear as small-scale decentralized sector units. It has also been reported that some powerlooms have illegally received orders placed on products reserved for handlooms by camouflaging themselves as handlooms and also by paying bribes. Because of the benefits they receive from the government policy, one of the most important political interests of powerloom weavers is whether the government keeps treating them equally to the handloom sector in terms of tax rates, subsidies, and reservation of certain products. Although a new textile policy drawing a distinction between mills and powerlooms was announced in 1985, the enforcement of the policy was not successful, and a large number of powerlooms are still unregistered and hence do not pay duties (Misra, 1993).

Cooperation and Competition Between Mills and Powerlooms⁶

The political relationship between the mill sector and the powerloom sector in India is complex. Historically, powerlooms were first set up by progressive handloom people in the early half of the century. In the 1950s and 1960s, however, a number of newer powerlooms were started by installing old looms scrapped by the composite mills in the western part of India. By the mid-1970s, many mill owners began to realize that they needed to sell inexpensive cloth to increase their market share (Goswami, 1985), and some composite mill owners not only sold off the looms, but also financed the growth of powerlooms in order to evade excise duty. It is also well-known that the mills subcontracted weaving to the powerlooms, and then finished and marketed the cloth by themselves during the eighteen-month mill Bombay strike in the early 1980s.

However, the powerlooms began to dominate the market of cotton cloth throughout the 1980s and 1990s. Now, the Mumbai (Bombay) mill owners, who once supported the powerlooms, are strongly against their growing presence. Conversely, southern spinning mills, who used to be indifferent with respect to the

powerlooms, want the state government to promote the powerloom sector, because in southern India there are not enough powerlooms and spinning mills have to sell more than half their spun yarn to powerlooms in the western region. Interestingly, some powerlooms have formed a political alliance to pursue their common interests with southern spinning mills. For example, in order to alter the 1985 Textile Policy, which was against the interest of powerlooms, the western powerlooms led by the All-India Powerloom Federation and the SIMA organized by the southern mills lobbied jointly in order to make the central government alter the policy, although it was not very successful.

Handloom Sector

The handloom sector is one of the poorest groups in India. Product-wise, the Indian handlooms are basically categorized into two groups - those that produce high value-added luxury fabric with unique traditional designs, and those that weave low value-added standardized cotton fabric. The former type, which accounts for roughly a quarter of all the handloom units, has their niche market where neither mills nor powerlooms can compete. Some of them tend to be operated using very primitive technology. Conversely, the latter type - handlooms that produce low-quality plain cloth - can barely survive with low wages and state subsidies.

Scattered in the rural areas all over the country, handloom weavers are the least well-organized group in the Indian cotton sector. Although handloom weavers tend to be hit harder than mills and powerlooms when cotton prices go up, most of them are politically silent. There are of course some organizations such as the Handloom and Handicrafts Association, but like the powerloom organizations, they are far less efficient in terms of lobbying than the ICMF. Olson's proposition also holds here.

However, despite their disorganization and lack of money for political contribution, handlooms can have an influence on policymakers when the cotton prices go up. This is partly because of the number of their votes, and partly because of the nationwide sympathy for them. Although the number of handloom weavers is roughly the same as powerloom weavers, the votes of handloom weavers are easier to control than workers in mills and powerloom, because many handloom weavers belong to the low caste in rural areas, where higher caste community leaders are often very influential. The nationwide psychological sympathy for poor handlooms is another important factor in explaining the pro-handloom policy in India. Often the handloom sector has been used as a political tool for politicians to attract popularity, votes and raise money. There are many politicians who own handlooms and head handloom co-operative societies in India.

Bureaucrats

The last, but not least important players in the political economy arena are bureaucrats.⁷ As in most other countries, government officials are reluctant to change the existing scheme in India. The first reason for this is that they are, after all, bureaucrats who prefer the status quo under the evaluation system of "deducting marks".⁸ Another factor that makes bureaucrats resistant to liberalization policies is corruption. It has been often alleged that the existing regulatory scheme is attractive for some government officials, because they secretly receive "rebates" from various interest groups. Naturally, these two factors - evaluation system and corruption - will lead the Indian bureaucrats to resist the liberalization of cotton exports.

Compared to farmers, powerloom weavers and handloom weavers, the government sector is particularly heterogeneous. At the central government level, cotton production is a matter for the Ministry of Agriculture, while cotton trading and cotton yarn exports are handled by the Ministry of Textiles. At the state government level, many state ministers tend to support the interests of farmers, although the extent depends upon the state; if the state does not produce cotton but has spinning activities, the state government tends to oppose looser cotton export quotas. There are political conflicts between the central government and each state government over quota allocation, and between the Ministry of Textiles and the Ministry of Agriculture within the central government. On top of this, there are some government officials who allegedly take bribes, which often makes political decision-making biased. One can imagine how difficult it is for the central government to satisfy all these conflicting interests.

⁷ Bardhan (1998) treats civil servants as one of the "dominant proprietary classes" in India.

⁸ The promotion of elite civil servants, called the Indian Administrative Service (IAS), is guaranteed so that most of them do not want to take risks.

CHAPTER 3

PROBLEMS OF THE COTTON EXPORT POLICY

3.1. ECONOMIC PROBLEMS

Cotton Farmers' Income Loss

The cotton export policy has caused a number of negative consequences. The largest cost imposed by the policy has been borne by farmers. The cotton farmers' income was adversely affected by the cotton price being kept low throughout the 1980s (**Table 5**). Also the suppressed cotton price caused adverse income distribution effects within the cotton production sector; while wealthier cotton farmers who grew more than one type of crop in irrigated areas were less affected, poorer farmers could not promptly switch from cotton to other new crops, such as castor seeds or sesame seeds when the price of cotton fell.

Table 5: Movement in Price Indices

Price Index	1981/2 - 1989/90
Wholesale Price Index (WPI)	+ 72 %
WPI for Manufacturers	+ 71 %
Consumer Price Index (CPI)	+ 93 %
CPI for Industrial Workers (General Index)	+ 96 %
CPI for Urban Non-manual Employees (General Index)	+ 92 %
Cotton Lint Price	+ 55 %
Cotton Yarn Price	+ 76 %
Cotton Cloth Price	+ 40 %

Source: Chaurdhuri (1994)

While microeconomic trade intervention in the cotton sector acted against cotton farmers, macroeconomic intervention had also been against them until recently in India. As in many other countries, the currency had been overvalued until macroeconomic liberalization began in 1991. This had kept the real farm-gate prices of cotton (in US dollars) at a low level for many years in India. It is only recently that the Rupee became convertible (in the current account) and the real exchange came close to the free market rate, which corrected part of the discrimination against the cotton production sector.

Slow Yield Growth

It is the commercial profitability of a crop that acts as a spring in the modernization of the production process, which in turn improves the yield growth rate (Krueger, Schiff and Valdes, 1992). Cotton is no exception to this rule. Unfortunately, the unattractiveness of the domestic cotton market price has contributed to stagnant yield growth of cotton in India. The problem is particularly serious in Maharashtra, where cotton distribution is monopolized by the state trader (**Table 6**).

Table 6: Yield Growth of Cotton

(kgs / ha)

State	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
Andhra Pradesh	458	485	494	506	610	650
Gujarat	229	277	212	308	351	339
Haryana	498	400	488	440	347	354
Maharashtra	135	93	79	141	87	99
Punjab	592	418	593	533	340	421
All India Average	300	269	266	311	278	300

Source: Office of the Textile Commissioner, GOI

The yield of cotton is still far lower than in many other countries, although agricultural technological progress has made it possible for India to produce long-staple cotton. The average yield of cotton per hectare of India is only half of the world average of 600 kgs per ha (**Table 7**). The cotton yields of countries such as the US, China and Egypt are somewhere between 500 to 750 kgs per ha. The yield of Pakistan is higher than that of Punjab in India, although both regions have similar climate, soil and irrigation conditions. Of course, the export restriction on cotton is not the only factor contributing to low yields. Other factors, such as the low percentage of irrigated areas, the lack of availability of good seeds and damage due to pest attacks, also led to stagnation of cotton yields in India. However, all these factors are in some way related to the price incentive.

Table 7: Production and Average Yield of Cotton in the World

Country	Production (million ton)	Area (thousand ha)	Yield (kg / ha)
Israel	27	16	1,697
Australia	329	260	1,266
Turkey	580	559	1,039
China	3,739	4,985	750
USA	3,515	5,173	679
Egypt	411	371	538
Pakistan	1,312	2,804	468
India	2,095	7,315	286
World Total	16,673	30,527	546

Source: ICAC (1994)

Many economists (for example, Gulati and Sharma, 1994) argue that liberalizing cotton exports will help Indian farmers improve agriculture management, which will, in turn, solve part of these problems. Some argue that if cotton yields do not improve, India may even face a shortage of cotton in the future. India has by far the largest acreage of cotton cultivation in the world and is the only country to produce a full range of varieties of nearly all staple lengths. It is unfortunate that India is not maximizing their comparative advantage of cotton production.

Inefficient Public Procurement of Cotton

While cotton yields have been stagnant, the loss of cotton by public cotton traders, particularly state traders, has further reduced the level of available cotton for domestic spinning mills in India. Often, public traders fix their purchasing price when the market is at its peak, sell it in the lean period, and end up with losses. Also, in seasons when the quality of cotton is poorer, they cannot find suitable buyers and build up large unsold stocks, which are eventually wasted. For example, Bhala (1995) pointed out that a significant amount of cotton was lost by the MAFED, which has monopolized cotton trading in Maharashtra for over two decades.

The incompetence of the public traders is even more apparent in the export market than in the domestic market. Finding the right quality and variety on time, keeping buyer connections, establishing a reputation are all essential factors to successful trading. Many public traders are not professionally trained, and cannot find suitable overseas buyers. Therefore, although most of the cotton export quota is allocated to public traders, private traders often act as middlemen on behalf of the public exporters. While the public

traders can enjoy most of the economic rent, the private brokers receive 1 per cent commission. Without the existence of private middlemen, India would not be able to sell as much cotton as it presently does, even if the export restriction were phased out.

Losing Exporting Opportunities

The existing scheme has made Indian cotton unpopular among overseas buyers for several reasons. Like industrial products, not only prices but also other factors such as timely shipment, reliable supply and high quality are important in today's competitive world cotton market. The first factor is timing of contract and shipment, which is particularly important for the cotton export business. Many private cotton brokers in India complain that the quota restriction policy has made it difficult for them to capture a share of the growing marketing opportunities in other countries. The ideal time for cotton exports in the world market is December, January and February, when major exporters such as Pakistan and Egypt are also there to make export contracts. Unfortunately, the Indian government announces its cotton export quota after January or February (with an exception in 1996). Then even after the announcement of the nationwide quota is made, it takes at least another month to complete the required procedures. Therefore, when the quota allocation is finally completed and traders are ready to export cotton, it is often too late to make an attractive deal. As a result, Indian cotton exporters appear in the world cotton market a few months after other countries' exporters have already made contracts with overseas buyers.

The fluctuation of exports is another problem of Indian cotton for overseas buyers. As the export quota level is decided in an *ad hoc* way due to continuous pressures from various interest groups as discussed in the next section, the exports fluctuate year by year, depending on the scenario of domestic cotton production and political situation. Since many overseas cotton buyers prefer a constant supply of cotton, they tend to avoid Indian cotton, which is not shipped constantly and hence is not suited for a long term contract.

The high levels of contamination and stickiness of cotton are also serious. In India, the cotton ginning and processing activities are reserved for specialized small-scale ginning mills in accordance with the Cotton Ginning and Processing Act in order to protect them. In most states, the ginning industry receives ginning rates fixed by the government. The reservation policy also prevents export-oriented spinning mills from setting up their own ginning and pressing facilities for export purposes. As a result, the domestic ginning and processing industry has been accustomed to low quality standards in the domestic market, paying little attention to quality improvement. Had the Indian government encouraged the exports of cotton and liberalized the cotton ginning and processing industry at least for the export purposes, the

cotton ginning and processing quality would have increased towards international standards, and this would have, in turn, benefited the domestic yarn and other textile production both in terms of quality and exports.

Mismatch of Cotton Varieties

Export restrictions on cotton have also caused the mismatch of cotton varieties in the domestic market in India. The staple length of cotton determines the right count of yarn spun from that cotton; long-staple cotton, medium-staple cotton, and short-staple cotton are most suited to the production of high-count (i.e., fine) yarn, medium-count yarn, and low-count (i.e., coarse) yarn, respectively.⁹ In India, out of the total domestic consumption of cotton, 53 per cent was long-staple (including extra-long staple), 41 per cent was medium-staple, and 6 per cent was short-staple, while 14 per cent of the cotton yarn produced by the domestic mills was over 61 counts, 47 per cent was 21 to 40 counts, and 39 per cent was 1 to 20 counts in 1994/95 (Table 8).

Table 8: Staple-wise Cotton Consumption and Count-wise Yarn Production

Cotton Staple	Staple-wise Share (A)	Yarn Count	Count-wise Share (B)	Ratio (A)/(B)
Long Staple	53 %	Over 60 Counts	14 %	3.8
Medium Staple	41 %	21 to 60 Counts	47 %	0.9
Short Staple	6 %	Up to 20 Counts	39 %	0.2
Total Cotton	100 %	Total Yarn	100 %	1.0

Sources: Office of the Textile Commissioner, GOI (1995) etc.

There are two domestic factors behind this gap. On the supply side, the proportion of long-staple cotton has increased at a faster pace than shorter-staple cotton. Conversely, on the cotton demand side, the majority of India's cotton yarn production is in medium- and lower-counts, and the production of higher-count yarn is still limited. This is because of the shifting preference of high income people from fine quality cotton textiles to man-made yarn textiles, technical constraints in the mill sector, and the high excise duty levied on higher counts of cotton yarn, as pointed out by Misra (1993). Thus, as a result of the excess supply of long-staple cotton in the domestic market, many spinning mills have overused higher-quality cotton. Moreover, the strength of lower counts of yarn has been sacrificed because longer staple cotton is not suitable for production.

The necessity to liberalize cotton exports is even more obvious if we consider the import of cotton,

which has been fully liberalized since 1994/95. Most of the cotton mills that import cotton need specific cotton varieties. With cotton imports being liberalized, there is no reason to continue cotton export restriction because India can export long-staple cotton freely and import short- and medium-staple cotton if there is a domestic shortage for short-staple cotton.

3.2. POLITICAL ECONOMY PROBLEMS

Public and Private Rent-seeking Activities

The conflicting interests over cotton exports under the current scheme have caused a vicious circle of more intense political activities by interest groups and less independent cotton export policy making by the government. Rent-seeking activities are rampant in both private and public sectors. Both public and private organizations send large delegations to Delhi frequently, presumably because they judge that the expected income gain from lobbying will be larger than the costs of their socially wasteful trips. For instance, it is reported that the GUJCOT sends a delegation of twenty to thirty members to Delhi every three months. The MAFED lobbies more than most public and private sector agencies, because its survival depends upon the central government's continuing approval of the cotton monopoly procurement scheme in Maharashtra, which is now under question. Without the monopoly scheme, the MAFED's sales would shrink as more efficient traders enter the market. Not surprisingly, the Chief Minister of Maharashtra has been busy lobbying for the extension of the monopoly scheme into the future.

Padded Crop Estimation by Interest Groups

The socially unproductive activities by interest groups do not end with the direct rent-seeking activities. Indirect rent-seeking activities - manipulation of the crop estimation at the meeting of the Cotton Advisory Board, for example - also account for a significant part of their strategy. Since the government decision on cotton export quota is based on the consensus made by the Cotton Advisory Board, which basically consists of the representatives of all concerned interest groups, each board member tends to bias its estimate of cotton supply or demand in order to influence the level of the quota. While the CCI and the EICA tend to inflate their estimates of cotton production in order to relax the export quota, the ICMF tends to report higher levels of domestic cotton requirements in order to block cotton exports. Pressured by different

⁹ Generally, cotton yarn spun from long-staple cotton looks more beautiful but is more easily torn than cotton yarn spun from short-staple cotton.

interest groups, the Cotton Advisory Board's cotton production estimate usually exceeds the estimate of the Directorate of the Cotton Development of the Ministry of Agriculture by more than 20 per cent (Table 9).

Table 9: Official and Trade Estimates of Cotton Production (thousand of 170 kg bales)

Year	DCD (A)	CAB (B)	EICA (C)	(B) - (A)	(C) - (A)
1985-86	87.27	107.00	115.50	19.73 (18.4%)	28.23 (24.4%)
1988-89	87.44	106.00	106.00	18.56 (17.5%)	18.56 (17.6%)
1989-90	114.22	135.75	135.75	21.53 (15.9%)	21.53 (15.9%)
1990-91	97.59	117.00	117.00	19.41 (16.6%)	19.41 (16.6%)
1991-92	97.14	119.00	120.78	21.66 (18.4%)	23.64 (19.6%)
1992-93	115.83	135.00	140.00	19.17 (14.2%)	24.17 (17.3%)

DCD: Directorate of Cotton Development, CAB: Cotton Advisory Board

EICA: East India Cotton Association, (): Difference in Percentage

Sources: Office of the Textile Commissioner, GOI (1995) etc.

Not only the annual production but also the opening stock of cotton is also often a matter of dispute. Representing the interest of cotton farmers and public traders, the CCI and the EICA tend to report higher levels of opening stock than other groups. For instance, against the Cotton Advisory Board's assumption of 2.37 million bales, the EICA estimated that there were 3.28 million bales in the opening stock of cotton in 1994/95.

Consequently, the current quota scheme has made the entire statistics of cotton demand, supply, opening stock and closing stock unreliable, unscientific and confusing. There is, moreover, no scientific way of judging whose estimates for cotton demand, supply and stock level were significantly incorrect even after the crop season is over. There is also no punishment mechanism for overestimating (or underestimating) groups that try to "cheat" policymakers. Under the current scheme, each group tries to maximize its long-term benefits by padded estimations, while making sure not to pad too much in order not to lose its credibility in the future.

Ad hoc and Short-sighted Decision Making

Thus, the quota scheme has simply induced more frequent lobbying activities and made government decision-making more *ad hoc*. Under the current quota scheme, the cotton export quota is announced in the beginning of a year, but is allocated little by little within the year. However, since the government adjusts the quota level throughout the year, interest groups become occupied with lobbying throughout the entire year. As a result, the government is always under lobbying pressure, which has made the export policy even

more *ad hoc* and short-sighted. Even if a scientific estimation is made by the Cotton Advisory Board, the export quota can be changed by politicians. Under the ongoing quota allocation scheme, the central government's decision to allocate export quota has been influenced by whether the central government and the cotton producing state government is headed by the same party or not. Also, the political background of the incumbent prime minister and his cabinet members - whether they are pro-farmer or pro-handloom - matters significantly for quota allocation.

Looking at the past trends, one may well wonder why so much cotton was exported under the quota in the year 1986/87, when cotton production had dropped sharply from the year before (**Table 10**). It is also difficult to explain why so little cotton export was allowed in 1991/92 compared to the year before, despite the increase in cotton production. The more carefully one analyzes the trends of cotton exports from the table, the more one is convinced that the export quota is decided erratically and inconsistently, with little scientific basis.

Table 10: Trends of Cotton Exports

(thousand of 170 kg bales)

Cotton Year	Production (as per DCD)	Production (as per CAB)	Consumption by Mills	Import	Export
1980/81	7,010	7,800	7,678	--	697
1981/82	7,884	8,400	7,123	50	400
1982/83	7,534	7,717	7,561	nil	665
1983/84	6,386	7,516	8,485	nil	353
1984/85	8,506	10,150	9,150	50	179
1985/86	8,727	10,700	9,167	nil	450
1986/87	6,905	9,500	9,520	nil	1,367
1987/88	6,432	9,000	9,491	300	44
1988/89	8,744	10,600	9,666	225	77
1989/90	11,422	13,575	10,236	nil	1,371
1990/91	9,759	11,700	10,757	--	1,190
1991/92	10,276	11,900	10,309	300	77
1992/93	12,067	13,500	11,281	115	1,376
1993/94	11,855	12,150	11,405	300	390
1994/95	11,756	13,850	11,937	589	108

Source: Office of the Textile Commissioner, GOI (1995)

Fluctuation of Cotton Prices and Speculation

Domestic political instability, the *ad hoc* decision for cotton exports by the government, and the fluctuation

of domestic cotton prices are all inter-related. Contrary to the belief of protectionists, restricting cotton exports has worsened the cotton price fluctuation in India rather than suppressed it. Price fluctuation of cotton is a serious problem not only for cotton farmers but also for mills, powerlooms and handlooms, because a good part of the fluctuation is eventually passed from farmers to mills to weavers. For that reason, even the weavers, who support the cotton export restriction, complain that the export quota should not be announced by the government unless a comfortable price trend is established and correct position of the crop is known.

The fact that government does not permit cotton futures trading demonstrates its determination to control the cotton market and makes clear its distrust of private traders in India. This is unfortunate because had cotton futures trading been allowed, as in many other countries, traders could have reduced price risks and would have had greater incentive to buy up cotton during the harvest season, reducing the post harvest price slump. Similarly, if there were a cotton futures market, mills could minimize the risk of lean season price rises and disruption in cotton supply, enabling them to plan future production (Misra, 1993). The limited access to the world market, *ad hoc* quota announcements by the government, and the lack of a cotton futures market - all contribute to the sharp fluctuation of cotton prices in India.

Against the government expectation to prevent speculation by private cotton traders, the current *ad hoc* quota announcement scheme has in fact enhanced the highly speculative nature of domestic cotton trading. The speculative cotton traders sell more cotton when the narrower export quota is announced by the central government, which causes further decreases in the cotton prices. A reliable and realistic assessment of the crop, which India unfortunately lacks, would be a remedy to rampant speculation in cotton and provide sound basis for taking decisions relating to domestic supply and prices.

3.3. IMPACTS ON THE SPINNING AND WEAVING INDUSTRY

Problems of the Hank Yarn Obligation in the Mill Sector

Among many regulations in the mill industry, the negative consequences of the hank yarn obligation, which has forced spinning mills to unwillingly accept unprofitable business, are particularly serious. The current obligation ratio of 50 per cent has no scientific basis, because the total production capacity of the handloom sector accounts for some 30 per cent of the total textiles manufacturing capacity in India, which means roughly 30 per cent of the yarn needs to be hank yarn in the domestic market. Consequently, the excessive obligation rate for hank yarn production has caused an oversupply of hank yarn in the domestic market,

which, in turn, has further pushed the selling price of hank yarn for mills down.

The intention of the policy combination of the hank yarn obligation and excise duty exemption of hank yarn was to subsidize inputs for handloom weavers. However, it is alleged that a significant amount of hank yarn is rewound to cone yarn. Although no one knows how much hank yarn is converted to cone yarn illegally, the issue cannot be considered negligible. In fact, the government-appointed Hussain Committee had to admit illegal rewinding of hank yarn to cone yarn exists (Ministry of the Textiles, 1990). While some powerlooms purchase hank yarn, and convert it to cone yarn, some handloom weavers work as hank yarn traders for powerloom weavers. Because hank yarn is less expensive and no excise duty is levied on it, compared to 5.75 per cent excise duty on cone yarn, the powerloom buyers can actually save money by this informal business, and the handloom weavers also earn a trade commission. Obviously, this profit-seeking activity is socially wasteful.

Poor enforcement of the hank yarn obligation is also a serious problem. One serious abuse resulting from the hank yarn obligation policy is the false declaration made by some spinning mills that some of the cone yarn made by them is actually hank yarn. This is done in collusion with the excise department officers. The mills gain doubly: first the hank yarn obligation is met for the record without taking the trouble and expense of making it; second, the excise duty on cone yarn (5.75 per cent) is saved since hank yarn is exempted from excise duty. While private mills and state-owned mills have more or less satisfied the 50 per cent hank yarn obligation, the National Textile Corporation (NTC) has recorded massive shortfalls of the obligation fulfillment. This is partly because the central government enterprise has accumulated an enormous amount of unrecoverable losses, and partly because the top management of the NTC has been reserved for senior civil servants of the government, who have good connections with the secretaries and joint secretaries of the Ministry of Textiles. Therefore, the Ministry of Textiles is a little reserved in punishing and forcing their old colleagues to improve the percentage fulfillment of the obligation. Naturally, the cost is eventually levied on private mills as an increased portion of the hank yarn obligation.

Recently the hank yarn obligation rule was modified to allow the transfer of the hank yarn quota between mills. However, it is not easy for mills in, say, Tamil Nadu to find a partner in Assam, even if we don't consider the transaction cost. Besides, the transfer permission of hank yarn obligation has also hindered "healthy" competition in the Indian mill industry. It has not only caused the oversupply of hank yarn but also created a unique inefficient "niche business" for some uncompetitive mills. As it is officially permitted to transfer hank yarn quota between mills, efficient mills that can make profits in the cone yarn market have transferred part of their hank yarn obligations to inefficient ones, which have neither competitiveness in cost nor quality in the cone yarn market. As a result, these inefficient mills lose all

managerial incentive to become efficient because they do not have to compete with efficient mills in the cone market. Without considering efficiency, they can specialize in the hank yarn market, and moreover, the duty exemption of hank yarn with an intention to protect handlooms acts as a subsidy for them.

Low Profitability, Low Capacity Utilization and Illegal Closure of Mills

All these regulations have resulted in low profitability in the Indian mill industry. According to the Reserve Bank of India (RBI), the gross profit as a percentage of sales was 7.3 per cent, and the net profit was negative in 1992/93. These figures were significantly lower than the corresponding numbers for all the Indian industries on average (11.0 per cent and 8.7 per cent, respectively) in the same year. The ICMF claims that about a half of their member mills are "sick". The textile units accounted for about one fifth of the total large number of large and medium "sick" units which had to receive credit of over Rs.10 million (US\$0.21 million) from banks in India. Many mills have been operating without making profits for years because of the "exit" barrier, which restricts mill owners from closing their unprofitable mills.

Owner-wise, the problem is much more serious in the public sector. This is partly because public mills are predominantly composite mills, which face severe competition from powerloom cloths, and partly because the public sector has taken over a number of private mills that had become financially non-viable. The production share of the public sector mill in the yarn market slipped from 19 per cent in 1988/89 to 11 per cent in 1994/95. Lack of modernization, low labor productivity, poor management and many other undesirable business features are common to them. As a consequence, the losses of public sector mills amounted to Rs.6 billion (US\$125 million) in 1993/94, and the total losses of these mills between 1989/90 to 1993/94 accumulated to Rs.21.6 billion (US\$450 million). Among the public sector textile companies, the one in most serious trouble is the National Textile Corporation (NTC), which is the largest public cotton spinning and weaving firm with annual sales of Rs.8 to 9 billion (US\$167 to 188 million) and controls about 12 per cent of all the mills in the country. The NTC group has never made a profit since it was established in 1968. Its losses have accumulated to Rs.40 billion (US\$833 million), which equals the company's five-year total sales. The reform of the NTC is one of the most difficult tasks for the government. Although the NTC has stopped taking over financially non-viable private mills, some of the state textile corporations are still taking them over.

The negative impact of the protection of the textile machinery industry is also serious in India. Because of the high import duty, the CIF prices of imported textile machinery have been much higher than the domestic machinery price. Besides, the foreign exchange required for the machinery imports has to be re-covered from the open market. As a result of the prohibitively high cost of importing textile machinery,

mills often have to wait for six to eight years for the delivery of the new machinery produced by domestic firms which had very limited production. Mill owners have complained about not only the slow delivery but also the poor quality of domestic textile machinery, which has lowered the productivity of mills. On top of this, high interest rates have contributed to the already high cost of capital for mills. Consequently, there are many mills that have not invested in their obsolete textile machinery for decades in India.

In the normal business environment, a company that makes losses every year will sooner or later disappear. However, because of the "exit" barrier - the restriction for mill owners to close their unprofitable units - many mill owners have been unable to close loss-making mills that virtually stopped operating many years ago. As a consequence, the Indian mill sector as a whole has recorded extremely low capacity utilization rates. The problem of low capacity utilization is even more serious for composite mills (which have both spinning and weaving capacities) than spinning mills. Half of the weaving capacity in the mill sector is idle, while the spinning utilization rate was stagnating at around 70 to 80 per cent from 1980/81 to 1993/94. In addition, the loom utilization rate of the composite mills fell sharply from 78 per cent to 54 per cent over the same period. The other social problem associated with the "exit" barrier is illegal closure. As admitted by the Hussain Committee, a good number of the closures were illegal, although the exact numbers will be never known (Ministry of the Textiles, 1990). This is primarily because mill owners wanted to avoid lengthy legal and other procedures required by the government. Some of the mill owners are alleged to have employed gangsters to make the illegal closure smooth and secret.

Unexpected Competition Between Powerlooms and Handlooms

Not only for efficiency but also for equity purposes, the government policy has not been successful in India. Initially the government expected to protect the handloom sector, the poorest group, by enforcing the regulations in the mill sector. However, it has turned out that it was the powerloom sector, rather than the handloom sector, which largely benefited from the government policy. As a result of the excessive regulations in the mill sector, the share of mill-made cloth in the cotton textile market has declined sharply from 36 per cent in 1980/81 to 6 per cent in 1994/95. During the same period, while the share of handloom cloth has been stagnant, the powerloom sector increased its share from 39 per cent to 72 per cent. In the export market, mill-made fabric exports have remained stagnant, while fabric exports by powerlooms have recorded a steady increase. These trends are expected to continue.

At the time of the independence, there were few powerlooms. In the past few decades, however, the powerloom sector has emerged as the single largest cloth production subsector, which has not only cut the share of composite mills but also adversely affected handlooms. As already mentioned, this is largely as

a result of the government policy, which treated powerlooms and handlooms equally as decentralized units as opposed to organized sector units. The policy mix of the hank yarn obligation and the excise duty exemption for hank yarn, for example, induced rewinding of hank yarn to cone, which helped powerlooms, leaving less hank yarn in the market.

It is ironic that the textile machinery industry and synthetic yarn industry as "infant" industries, which were supposed to develop under import substitution policy, never became internationally competitive, while the powerloom sector, which did not receive any "official" support from the government did benefit unofficially from the government policies and grew rapidly. Powerlooms are now competing with handlooms in the same market. While mills concentrate on the cloth woven from medium-count yarn from 10s to 30s, powerlooms and handlooms produce high share of cloth woven either by coarse yarn or fine yarn of over 40s count. This implies that powerlooms compete with handlooms more than they do with mills. In fact, most states that have registered a marked decline in handlooms have become important powerloom centers. As recognized by the Mehta Committee, while the growth of the powerloom sector did not have such seriously adverse effects on handlooms in the western part of India, it adversely affected handlooms in the southern part of the country, such as Tamil Nadu and Andhra Pradesh. In addition, handlooms that are located near urban areas are facing even more intense competition from powerlooms because of smaller transport costs from weavers to consumers.

CHAPTER 4

SIMULATION OF THE LIBERALIZATION

4.1. SIMULATION MODEL

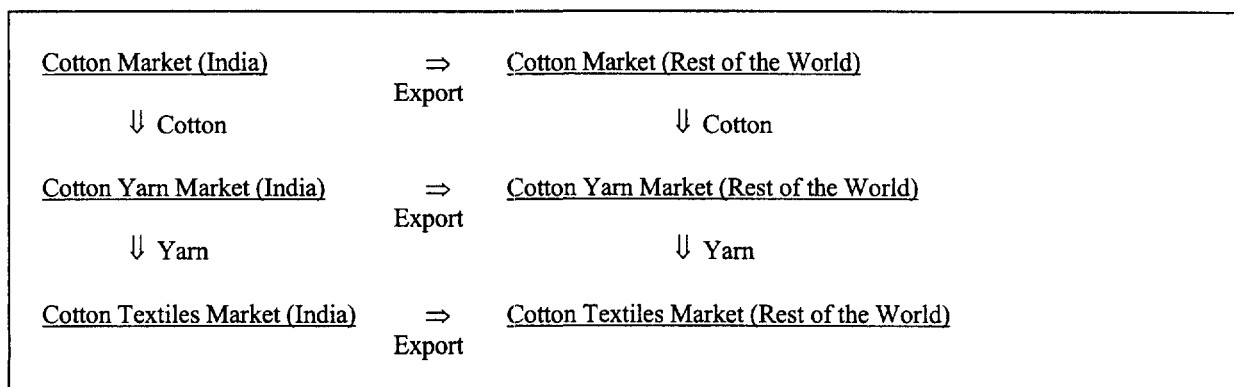
Choice of the Multi-Market Model

The problem of the cotton export policy is manifest from earlier chapters, and liberalization in the cotton sector appears to be much needed in India. However, the policy analysis is not complete without assessing how feasible the reform task is. This requires one to find the potential gainers and losers resulting from the policy change. To date, no research has been conducted to quantify the impacts of liberalization policy in the Indian cotton sector. Although it is easily predictable that weavers will be hit by the reform, it is not easy to compute how seriously they will be affected and how much the government needs to spend to compensate them.

The simulation attempted for this research is based on a multi-market model. The objective of the modeling approach is to develop a tool that could be adopted in a wide variety of situations without imposing undue data requirements, while capturing the pervasive linkages that characterize commodity factors and product markets. In other words, the modeling approach is as an effective compromise between overly simple, easily-implemented single-commodity approaches and more comprehensive but more complex general equilibrium approaches for the analysis of policy issues.¹⁰

If we apply a single-commodity partial equilibrium model to the case of the Indian cotton sector, income changes of suppliers and consumers in each market - cotton, yarn, and textiles - are measured independently, assuming no linkages among the three markets. However, this assumption is highly unrealistic, because all three markets are related with each other. Cotton spinning mills, for example, are consumers in the cotton market and suppliers in the yarn market. Similarly, cotton textile weavers are consumers in the yarn market while they are suppliers in the textile market, as depicted below. Therefore, the result of the single-commodity partial equilibrium model for the Indian cotton yarn market is likely to give misleading answers.

¹⁰ The multi-market model was first proposed by Braverman and Hammer at the World Bank. The technical explanation for the modeling approach is detailed in Sadoulet and de Janvry (1993).



On the other hand, it is also possible to develop a more complex general equilibrium model. In the general equilibrium-type simulation, one can estimate not only the income changes of farmers, spinning mills and weavers but also the macroeconomic impacts of the cotton sector reform. However, this modeling approach requires inordinate data requirements, and it makes sense to choose this approach only if the cotton sector is large enough to influence the macroeconomic indicators. Although cotton is one of the major agricultural commodities produced in India, the cotton sector does not account for more than 5 per cent of the country's GDP. Cotton for India is not like diamonds for Botswana, cocoa for Ghana, oil for Nigeria, or copper for Zambia. For that reason, a general equilibrium modeling approach was not chosen.

Innovation of the Model

One of the innovations that distinguish this model from other ordinary multi-market models is the endogenous computation of price elasticities. Because of the vertical integration of the three markets - the consumer in the cotton market is a supplier in the yarn market, and the consumer in the yarn market is a supplier in the textile market - it is not appropriate to assume elasticities in each market independently. For example, there should be a linkage between the demand elasticity of cotton in the cotton market and supply elasticity of yarn in the yarn market, for example, because both of the elasticities depend on the behavior of the mill industry. Therefore, among twenty elasticities in the three Indian markets, only four elasticities are given exogenously, with the other sixteen computed endogenously based on the cost share.

Another innovation of this model is its ability to distinguish short-run and long-run simulation results unlike ordinary multi-market models. In this model, it is assumed that the share of capital is a fixed cost in the short-run (i.e., capital is treated as an exogenous value, which cannot be changed by the manufacturers) and becomes a variable cost (i.e., capital becomes endogenous) in the long-run. These two innovations are made possible by assuming the endogenous price relations among elasticities as

detailed in the subsequent section in this chapter.

Structure of the Model

The model consists of six interrelated markets - cotton markets, cotton yarn markets, and cotton textile markets, all of which are in India and in the rest of the world. The exogenous policy factors in the simulation are the removals of export quotas and the hank yarn obligation. Each market has a supply and demand function, and the equilibrium flows depend on the changes in prices. For example, cotton yarn supply is a function of cotton consumer price and yarn producer price, while cotton yarn demand is a function of yarn consumer price and textiles producer price in India, and the excess supply of yarn in the Indian market is exported to the rest of the world. The change in the cotton yarn supply in India is equal to the sum of (i) the supply elasticity of cotton with respect to the cotton consumer price times the change in the cotton consumer price and (ii) the supply elasticity with respect to the yarn producer price times the change in the yarn producer price.

The changes in prices in India are the results of new export policies, tax rates, and subsidy schemes. For instance, the cotton consumer price goes up when the government removes the cotton export quota and/or increases the cotton consumer tax rate. Market clearing conditions and identities are detailed below. The model is based on the large country assumption; India's export increase (or decrease) of cotton or yarn will affect the world price of that commodity.

Cotton Market

Indian Market

$$S_c(P_{pc}) = D_c(P_{cc}, P_{py}) + X_c$$

$$\text{s.t.} \quad P_{pc} = P_{wc} / t_{xc} \times t_{pc}$$

$$P_{cc} = P_{wc} / t_{xc} \times t_{cc}$$

$$P_{py} = P_{wy} / t_{xy} \times t_{py}$$

World Market

$$S_{wc}(P_{wc}) + X_c = D_{wc}(P_{wc}, P_{wy})$$

Yarn Market

Indian Market

$$S_y(P_{cc}, P_{py}) = D_y(P_{cy}, P_{pt}) + X_y$$

$$\text{s.t.} \quad P_{cc} = P_{wc} / t_{xc} \times t_{cc}$$

$$P_{py} = P_{wy} / t_{xy} \times t_{py}$$

$$P_{cy} = P_{wy} / t_{xy} \times t_{cy}$$

$$P_{pt} = P_{wt} / t_{xt} \times t_{pt}$$

World Market

$$S_{wy}(P_{wc}, P_{wy}) + X_y = D_{wy}(P_{wy}, P_{wt})$$

Textiles Market

Indian Market

$$S_t(P_{cy}, P_{pt}) = D_t(P_{ct}) + X_t$$

$$\text{s.t.} \quad P_{cy} = P_{wy} / t_{xy} \times t_{cy}$$

World Market

$$S_{wt}(P_{wy}, P_{wt}) + X_t = D_{wt}(P_{wt})$$

$$P_{pt} = P_{wt} / t_{xt} \times t_{pt}$$

$$P_{ct} = P_{wt} / t_{xt} \times t_{ct}$$

where

Endogenous Variables

Sc = Supply of cotton, India

Dc = Demand of cotton, India

Swc = Supply of cotton, Rest of the world

Dwc = Demand of cotton, Rest of the world

Xc = Export of cotton, India

Sy = Supply of yarn, India

Dy = Demand of yarn, India

Xy = Export of yarn, India

Swy = Supply of yarn, Rest of the world

Dwy = Demand of yarn, Rest of the world

St = Supply of textiles, India

Dt = Demand of textiles, India

Xt = Export of textiles, India

Swt = Supply of textiles, Rest of the world

Dwt = Demand of textiles, Rest of the world

Ppc = Producer price of cotton, India

Pcc = Consumer price of cotton, India

Pwy = World price of yarn

Ppy = Producer price of yarn, India

Pcy = Consumer price of yarn, India

Pwt = World price of textiles

Ppt = Producer price of textiles, India

Pct = Consumer price of textiles, India

Pwt = World price of textiles

Exogenous Variables (Policy Option Variables)

txc = Cotton export tax rate (quota equivalent), India

tpc = Cotton producer tax / subsidy rate, India

tcc = Cotton consumer tax / subsidy rate, India

txy = Yarn export tax rate (quota equivalent), India

tpy = Yarn producer tax / subsidy rate, India

tcy = Yarn consumer tax / subsidy rate, India

txt = Textiles export tax rate (quota equivalent), India

tpt = Textiles producer tax / subsidy rate, India

tct = Textiles consumer tax / subsidy rate, India

Initial Values

Data used to calibrate the simulation model are based on the official data in various sources (Office of the Textiles Commissioner, 1994-2000, EICA, 1995-2000, and ICAC, 1994-2000). As for the cotton production in India, the initial values are based on the data of the Cotton Advisory Board, rather than the data of the Ministry of Agriculture in order to make them consistent with other values. Although there are many varieties of cotton, the spinnable cotton market is not divided by variety in this model. This is partly due to the lack of sufficient data and partly because both long-staple cotton and medium-staple cotton, and medium-staple cotton and short-staple cotton are substituted for each other. In other words, cotton is treated as homogeneous in this model so far as it is spinnable.

While spinnable cotton is treated in one category in the model, non-spinnable cotton (*deshi* cotton) is excluded from the simulation. The two main reasons are that the market of non-spinnable cotton is completely different from the market of spinnable cotton, and that non-spinnable cotton is freely exported

by private traders in the open bidding market in India. On the supply side, farmers cannot very easily switch from non-spinnable cotton to spinnable cotton, because of the different soil conditions. On the demand side, *deshi* cotton is not consumed by downstream textile industries but used for other industrial purposes. All the initial values used in the simulation are shown in Table 11.

Table 11: Initial Values

Commodity	Supply India (mkg)	Demand India (mkg)	Export India (mkg)	Supply World (mkg)	Demand World (mkg)	Producer Price (Rs/kg)	Consumer Price (Rs/kg)	World Price (Rs/kg)
Cotton	1,900	1,800	100	16,500	16,600	53	55	61
Cotton Yarn	1,500	1,300	200	16,600	16,800	91	97	106
Cone Yarn	1,050	850				93	100	
Hank Yarn	450	450				83	89	
Cotton Textiles	1,400	1,000	400	9,600	10,000	217	221	221
Powerloom	960	600	360			216		
Handloom	440	400	40			219		

Sources: EICA (1995), ICAC (1994), Office of the Textile Commissioner (1995) etc.

Assumption on Hank Yarn

Another assumption is in regards to hank yarn. In the Indian yarn market, two kinds of cotton yarn – cone yarn and hank yarn - are traded. Cone yarn is consumed by the powerlooms and composite mills while hank yarn is exclusively processed by handlooms. No hank yarn is exported from India as there is no world market. It is assumed that so far as the current hank yarn obligation policy is not subject to change, spinning mills will keep winding 30 per cent (i.e., current rate) of their domestic cotton yarn supply in hank form.

If the hank yarn obligation is phased out, spinning mills will supply only cone yarn. This assumption is reasonable because the production process of hank yarn is exactly the same as cone yarn except for the final process - winding in either cone form or hank form, which is why it is easy for mills to switch from hank yarn production to cone yarn production. With no hank yarn in the market, handloom weavers will have to purchase cone yarn in the domestic market and rewind it to hank form by paying extra rewinding costs.

Price Elasticities

This multi-market model computes some of the price elasticities endogenously. Although various empirical studies attempted to measure price elasticities for cotton and textiles in the past (Goswami, 1990, Ministry

of Supply and Textiles, 1985, and Coleman and Thigpen, 1991), there have been no comprehensive studies to cover all the twenty elasticities which are needed in the model. Most of the past studies focused on the income and price elasticities of demand for cotton textiles by consumers (disaggregated by income levels), and what we can learn from them is that price elasticities in the cotton sector are generally very small.

In the multi-market model, the consistency among different elasticities is important. Considering that all the three markers are related with each other, it is not appropriate to mix the different elasticities from different sources into one elasticity set in this simulation model. Therefore, rather than relying on the results of past studies, this model computes most of the elasticities endogenously by assuming that the ratios among the elasticities depend on the cost structure for producers. In other words, the absolute value of the elasticity of demand of one input with respect to the price of that input divided by the supply elasticity of their final product with respect to the price of that product is equal to the cost share of the particular input in the long-run analysis (See **Appendix A** for proof). For example, the ratio between the supply elasticity of yarn with respect to cotton price and the supply elasticity of yarn with respect to yarn price is - 0.6 (-0.12/0.2) because 60 per cent of the total cost of yarn production is considered to be cotton. In the short-run, however, elasticities tend to be smaller as capital costs are fixed. For example, assuming that the capital cost for a spinning mill is 20 per cent, the elasticity of cotton demand with respect for the yarn price in the short-run is 20 per cent smaller than in the long-run. All the elasticities for India are shown in **Table 12**.

Table 12: Price Elasticities

(A) Short-term Elasticities (India)

Elasticity for \ w.r.t.		P _C	P _Y	P _T
Farmer	S _C	0.200		
Spinning	D _C	-0.072	0.096	
Mill	S _Y	-0.120	0.160	
Textile	D _Y		-0.032	0.072
Weaver	S _T		-0.080	0.180
Consumer	D _T			-0.100

(B) Long-term Elasticities (India)

Elasticity for \ w.r.t.		P _C	P _Y	P _T
Farmer	S _C	0.200		
Spinning	D _C	-0.072	0.120	
Mill	S _Y	-0.120	0.200	
Textile	D _Y		-0.032	0.080
Weaver	S _T		-0.080	0.200
Consumer	D _T			-0.100

where S_C = Cotton Supply, D_C = Cotton Demand, S_Y = Yarn Supply
D_Y = Yarn Demand, S_T = Textile Supply, D_T = Textile Demand
P_C = Cotton Price, P_Y = Yarn Price, P_T = Textile Price

bold (e.g. 0.02 for the supply elasticity of cotton with respect to cotton farmer in India) numbers are given exogenously, and the other numbers are computed endogenously.

The absolute values of the elasticities for the rest of the world are set to be two thirds of the equivalent elasticities for India, because cotton, cotton yarn and textiles are produced not only in developing countries but also in developed countries, where elasticities are generally lower than developing countries.

Also, in order to avoid the dependence of the simulation results on the elasticity assumption, simulations are attempted with four different sets of elasticities. The results are fairly similar with each other (See **Appendix B** for details).

Integrating Markets

Given the market clearing conditions, identities, initial values for endogenous and exogenous variables, and elasticities, the simulation model solves the simultaneous equations by using inverse matrices. Although there are six equations for six markets, we can integrate them into three equations by plugging the variable of export from India into the rest of the world market. The following shows the flows of computation in the multi-market model.

$$\begin{aligned} Sc(Pwc, txc, tpc) + Swc(Pwc) &= Dc(Pwc, txc, tcc, Pwy, txy, tpy) + Dwc(Pwc, Pwy) \\ Sy(Pwc, txc, tcc, Pwy, txy, tpy) + Swy(Pwc, Pwy) &= Dy(Pwy, txy, tcy, Pwt, txt, tpt) + Dwy(Pwy, Pwt) \\ St(Pwy, txy, tcy, Pwt, txt, tpt) + Swt(Pwy, Pwt) &= Dt(Pwt, txt, tct) + Dwt(Pwt) \end{aligned}$$

where

$$\begin{aligned} Pwc &= Ppc \times txc / tpc = Pcc \times txc / tcc \\ Pwy &= Ppy \times txy / tpy = Pcy \times txy / tcy \\ Pwt &= Ppt \times txt / tpt = Pct \times txt / tct \end{aligned}$$

Cotton Market (India and the Rest of the World)

$$\begin{aligned} &\{ (dSc/dPc)/(Sc/Ppc) \times (dPpc/dPwc)/(Ppc/Pwc) \times Sc \times (dPwc/Pwc) \} \\ &+ \{ (dSc/dPpc)/(Sc/Ppc) \times (dPpc/dtxc)/(Ppc/txc) \times Sc \times (dtxc/txc) \} \\ &+ \{ (dSc/dPpc)/(Sc/Ppc) \times (dPpc/dtpc)/(Ppc/tpc) \times Sc \times (dtpc/tpc) \} \\ &+ \{ (dSwc/dPwc)/(Swc/Pwc) \times Swc \times (dPwc/Pwc) \} \\ = &\{ (dDc/dPcc)/(Dc/Pcc) \times (dPcc/dPwc)/(Pcc/Pwc) \times Dc \times (dPwc/Pwc) \} \\ &+ \{ (dDc/dPcc)/(Dc/Pcc) \times (dPcc/dtxc)/(Pcc/txc) \times Dc \times (dtxc/txc) \} \\ &+ \{ (dDc/dPcc)/(Dc/Pcc) \times (dPcc/dtcc)/(Pcc/tcc) \times Dc \times (dtcc/tcc) \} \\ &+ \{ (dDc/dPpy)/(Dc/Ppy) \times (dPpy/dPwy)/(Ppy/Pwy) \times Dc \times (dPwy/Pwy) \} \\ &+ \{ (dDc/dPpy)/(Dc/Ppy) \times (dPpy/dtxy)/(Ppy/txy) \times Dc \times (dtxy/txy) \} \\ &+ \{ (dDc/dPpy)/(Dc/Ppy) \times (dPpy/dtpy)/(Ppy/tpy) \times Dc \times (dtpy/tpy) \} \\ &+ \{ (dDwc/dPwc)/(Dwc/Pwc) \times Dwc \times (dPwc/Pwc) \} \\ &+ \{ (dDwc/dPwy)/(Dwc/Pwy) \times Dwc \times (dPwy/Pwy) \} \end{aligned}$$

where

$(dSc/dPc)/(Sc/Ppc)$	= Supply elasticity of cotton with respect to cotton producer price, India
$(dDc/dPcc)/(Dc/Pcc)$	= Demand elasticity of cotton with respect to cotton consumer price, India
$(dDc/dPpy)/(Dc/Ppy)$	= Demand elasticity of cotton with respect to yarn producer price, India
$(dSwc/dPwc)/(Swc/Pwc)$	= Supply elasticity of cotton with respect to cotton producer price, World
$(dDwc/dPwc)/(Dwc/Pwc)$	= Demand elasticity of cotton with respect to cotton consumer price, World
$(dDwc/dPwy)/(Dwc/Pwy)$	= Demand elasticity of cotton with respect to yarn producer price, World

Yarn Market (India and the Rest of the World)

$$\begin{aligned}
& \{(dSy/dPcc)/(Sy/Pcc) \times (dPcc/Pwc)/(Pcc/Pwc) \times Sy \times (dPwc/Pwc)\} \\
& + \{(dSy/dPcc)/(Sy/Pcc) \times (dPcc/dtxc)/(Pcc/txc) \times Sy \times (dtxc/txc)\} \\
& + \{(dSy/dPcc)/(Sy/Pcc) \times (dPcc/tcc)/(Pcc/tcc) \times Sy \times (dtcc/tcc)\} \\
& + \{(dSy/dPpy)/(Sy/Ppy) \times (dPpy/dPwy)/(Ppy/Pwy) \times Sy \times (dPwy/Pwy)\} \\
& + \{(dSy/dPpy)/(Sy/Ppy) \times (dPpy/txy)/(Ppy/txy) \times Sy \times (dtxy/txy)\} \\
& + \{(dSy/dPpy)/(Sy/Ppy) \times (dPpy/dtpy)/(Ppy/tpy) \times Sy \times (dtpy/tpy)\} \\
& + \{(dSwy/dPwc)/(Swy/Pwc) \times Swy \times (dPwc/Pwc)\} \\
& + \{(dSwy/dPwy)/(Swy/Pwy) \times Swy \times (dPwy/Pwy)\} \\
& = \{(dDy/dPcy)/(Dy/Pcy) \times (dPcy/dPwy)/(Pcy/Pwy) \times Dy \times (dPwy/Pwy)\} \\
& + \{(dDy/dPcy)/(Dy/Pcy) \times (dPcy/dtxy)/(Pcy/txy) \times Dy \times (dtxy/txy)\} \\
& + \{(dDy/dPcy)/(Dy/Pcy) \times (dPcy/dtcy)/(Pcy/tcy) \times Dy \times (dtcy/tcy)\} \\
& + \{(dDy/dPpt)/(Dy/Ppt) \times (dPpt/dPwt)/(Ppt/Pwt) \times Dy \times (dPwt/Pwt)\} \\
& + \{(dDy/dPpt)/(Dy/Ppt) \times (dPpt/dtxt)/(Ppt/txt) \times Dy \times (dtxt/txt)\} \\
& + \{(dDy/dPpt)/(Dy/Ppt) \times (dPpt/dtpy)/(Ppt/tpy) \times Dy \times (dtpy/tpy)\} \\
& + \{(dDwy/dPwy)/(Dwy/Pwy) \times Dwy \times (dPwy/Pwy)\} \\
& + \{(dDwy/dPwt)/(Dwy/Pwt) \times Dwy \times (dPwt/Pwt)\}
\end{aligned}$$

where

$(dSy/dPcc)/(Sy/Pcc)$	= Supply elasticity of yarn with respect to cotton consumer price, India
$(dSy/dPpy)/(Sy/Ppy)$	= Supply elasticity of yarn with respect to yarn producer price, India
$(dDy/dPcy)/(Dy/Pcy)$	= Demand elasticity of yarn with respect to yarn consumer price, India
$(dDy/dPpt)/(Dy/Ppt)$	= Demand elasticity of yarn with respect to textiles producer price, India
$(dSy/dPwc)/(Swy/Pwc)$	= Supply elasticity of yarn with respect to cotton consumer price, World
$(dSwy/dPwy)/(Swy/Pwy)$	= Supply elasticity of yarn with respect to yarn producer price, World
$(dDwy/dPwy)/(Dwy/Pwy)$	= Demand elasticity of yarn with respect to yarn consumer price, World
$(dDwy/dPwt)/(Dwy/Pwt)$	= Demand elasticity of yarn with respect to textiles producer price, World

Textiles Market (India and the Rest of the World)

$$\begin{aligned}
& \{(dSt/dPcy)/(St/Pcy) \times (dPcy/dPwy)/(Pcy/Pwy) \times St \times (dPwy/Pwy)\} \\
& + \{(dSt/dPcy)/(St/Pcy) \times (dPcy/dtxy)/(Pcy/txy) \times St \times (dtxy/txy)\} \\
& + \{(dSt/dPcy)/(St/Pcy) \times (dPcy/dtcy)/(Pcy/tcy) \times St \times (dtcy/tcy)\} \\
& + \{(dSt/dPpt)/(St/Ppt) \times (dPpt/dPwt)/(Ppt/Pwt) \times St \times (dPwt/Pwt)\} \\
& + \{(dSt/dPpt)/(St/Ppt) \times (dPpt/dtxt)/(Ppt/txt) \times St \times (dtxt/txt)\} \\
& + \{(dSt/dPpt)/(St/Ppt) \times (dPpt/dtpy)/(Ppt/tpy) \times St \times (dtpy/tpy)\} \\
& + \{(dSwt/dPwy)/(Swt/Pwy) \times Swt \times (dPwy/Pwy)\} \\
& + \{(dSwt/dPwt)/(Swt/Pwt) \times Swt \times (dPwt/Pwt)\} \\
& = \{(dDt/dPct)/(Dt/Pct) \times (dPct/dPwt)/(Pct/Pwt) \times Dt \times (dPwt/Pwt)\} \\
& + \{(dDt/dPct)/(Dt/Pct) \times (dPct/dtxy)/(Pct/txy) \times Dt \times (dtxy/txy)\} \\
& + \{(dDt/dPct)/(Dt/Pct) \times (dPct/dtcy)/(Pct/tcy) \times Dt \times (dtcy/tcy)\} \\
& + \{(dDwt/dPwt)/(Dwt/Pwt) \times Dwt \times (dPwt/Pwt)\}
\end{aligned}$$

where

$(dSt/dPcy)/(St/Pcy)$	= Supply elasticity of textiles with respect to yarn consumer price, India
$(dSt/dPpt)/(St/Ppt)$	= Supply elasticity of textiles with respect to textiles producer price, India
$(dDt/dPct)/(Dt/Pct)$	= Demand elasticity of textiles with respect to textiles consumer price, India

$(dSwt/dPwy)/(Swt/Pwy)$	= Supply elasticity of textiles with respect to yarn consumer price, World
$(dSwt/dPwt)/(Swt/Pwt)$	= Supply elasticity of textiles with respect to textiles producer price, World
$(dDwt/dPwt)/(Dwt/Pwt)$	= Demand elasticity of textiles with respect to textiles consumer price, World

4.2. SIMULATION RESULTS WITHOUT COMPENSATION

Export Liberalization - Income Transfer to Farmers

Eight different cases where export quotas for cotton and yarn are phased out are simulated to measure the net income¹¹ changes of various groups in the research. Among them, first, two cases with *no* compensation schemes are simulated in this section. In Case 1, the exports of cotton and cotton yarn are liberalized, but the hank yarn obligation policy is still kept. In Case 2, not only cotton and cotton yarn export restrictions but also the hank yarn obligation are phased out. In neither of the cases are special subsidies provided to the losing groups.

According to the simulation, the removal of cotton and yarn export quotas will result in the income transfer from cotton farmers to textile weavers as a result of the domestic cotton price increase (Case 1). While cotton farmers' net income will increase by 15 per cent, the averaged net income of the weaving industry will decline by 6 per cent. Compared to powerloom weavers, handloom weavers are hit even more seriously by free cotton exports - their net income will decrease by 12 per cent (Table 13). The net income of the spinning industry will change significantly by the export liberalization, because both cotton (input for spinning mills) prices and cotton yarn (output) prices will go up.

Table 13: Net Income Changes Without Compensation

		Present Case	Case 1	Case 2
Policy Changes	Export Policy	Cotton and yarn export quotas	No export quotas	
	Hank Yarn Obligation	50%	50%	None
Net Income Changes	Cotton Farmer	0%	+15%	+15%
	Spinning Mill	0%	+1%	+15%
	Textile Weaver	0%	-6%	-8%
	Powerloom	0%	-3%	-4%
	Handloom	0%	-12%	-16%
Total		0%	2%	+2%

¹¹ By definition in this analysis, net income is gross margin (i.e., total revenue minus raw materials cost). It is not the same as profit or welfare, but since the cost structure of each producer is not known and the measurement of welfare can be subjective, we have measured the margin as an indicator of welfare.

If not only the export quota but also the hank yarn obligation is phased out, handloom weavers will be affected even more adversely. This income gain of the spinning industry (15 per cent) is as a result of the hank yarn liberalization, which allows spinning mills to supply cone yarn as much as possible. On the contrary, the income decline of handlooms will increase from 12 per cent (Case 1) to 16 per cent (Case 2), because handloom weavers will have to purchase cone yarn in the domestic market and pay extra costs to rewind it to hank yarn. Considering that most handloom weavers are already very poor, this level of income loss will be intolerable for them. In short, if the government removes all the export restrictions and the hank yarn obligation, many handloom weavers will not be able to survive.

4.3. SIMULATION RESULTS WITH COMPENSATION

Necessity of Compensatory Schemes

Considering the magnitude of the liberalization, it is necessary for the government to provide some sort of compensation to textile weavers. In the following sections, six cases with different types of compensation programs are simulated to assess each program from the viewpoint of effectiveness and financial cost. While exports of cotton and yarn are fully liberalized in all the six cases, the hank yarn obligation is not phased out in two cases (Cases 3 and 6). Textile weavers will receive several benefits from the government to offset their losses due to the export liberalization. The yarn consumer tax (currently from 2 to 4 per cent) and the textile producer tax are abolished in all the six cases. In three cases (Cases 6, 7, and 8), all the weavers receive direct producer subsidies of 5 per cent. Moreover, the government provides handloom weavers additional subsidies (5 per cent of the cone yarn purchase price) to convert cone yarn to hank in two cases (Cases 5 and 8).

Although these compensation programs cost the government, cotton farmers are not taxed for their extra income to balance the budget in any of the cases. This will make the analysis realistic, when we consider the political strength of farmers in India. Also the cotton yarn producer tax is not changed from the present levels of 5.75 per cent for cone yarn and from 0 to 3.45 per cent for hank yarn in any cases. Both the comparisons between Case 4 and Case 5 (**Table 14**) and between Case 7 and Case 8 (**Table 15**) suggest if the hank yarn obligation is removed, extra subsidies will be needed to compensate the income losers. Assuming that the government can efficiently distribute subsidies to them, both the powerloom and handloom weavers will be rescued (Cases 5 and 8).

Table 14: Net Income Changes With Compensation (Tax Exemption for Weavers)

		Case 3	Case 4	Case 5
Policy Changes	Export Policy	No export quotas		
	Hank Yarn Obligation	50%	None	None
	Compensatory Policies	No tax (weaver)	No tax (weaver)	No tax (weaver) and cone yarn consumer subsidy (handloom)
Net Income Changes	Cotton Farmer	+15 %	+15 %	+15 %
	Spinning Mill	+1 %	+15 %	+15 %
	Textile Weaver	-2 %	-3 %	-1 %
	Powerloom	+1 %	-0 %	-0 %
	Handloom	-7 %	-11 %	-3 %
	Total	+4 %	+5 %	+6 %

Table 15: Net Income Changes With Compensation (Subsidies to Weavers)

		Case 6	Case 7	Case 8
Policy Changes	Export Policy	No export quotas		
	Hank Yarn Obligation	50%	None	None
	Compensatory Policies	Producer subsidy (weaver)	Producer subsidy (weaver)	Producer subsidy (weaver) and yarn consumer subsidy (handloom)
Net Income Changes	Cotton Farmer	+15 %	+15 %	+15 %
	Spinning Mill	+0 %	+15 %	+15 %
	Textile Weaver	+5 %	+3 %	+4 %
	Powerloom	+6 %	+6 %	+6 %
	Handloom	+1 %	-3 %	+2 %
	Total	+7 %	+8 %	+9 %

Changes in Export Values

The simulation analysis has so far focused on the income changes of various groups, paying special attention to handloom weavers. When we analyze the impacts of the policy reform, however, there are two other important factors to be considered - changes in exports and government revenue. This section analyzes how the reform will affect the exports of cotton, yarn, and textiles.

First, the export liberalization will undoubtedly increase the volume of cotton export, as the cotton farmers respond to the increase in domestic cotton price. Not only in terms of volume but also in terms of value cotton exports will increase by 37 to 44 per cent in value (**Table 16**). This is because India is not a major exporter of cotton (even after the liberalization) in the world market, and hence the export increase does not have major impacts on the world price. The hank yarn liberalization decreases cotton exports, as the spinning mills consume more cotton (Cases 2 and 8).

Second, although cotton yarn exports will also increase, it will not be as much as cotton exports

either in terms of volume or value. The relatively modest increase in cotton yarn exports is as a result of the increase in cotton price, which discourages domestic mills from consuming cotton. Among the eight cases simulated, the value cotton exports is the largest, when the hank yarn obligation is phased out while no compensatory policies are introduced (Case 2). It is because the spinning industry has an incentive to produce more cotton yarn while the weaving industry does not consume as much yarn without subsidies, which results in more surplus yarn in the domestic market.

Third, while exports of cotton and yarn will increase, cotton textile export will slightly decrease both in volume and value terms, if the government does not subsidize the textile weavers (Cases 1 and 2). This is because weavers will produce less textile when the yarn price increases. However, if the government compensates the powerlooms and handlooms, the export of cotton textiles will slightly increase (Cases 4 and 8). As a result of the increase in cotton exports, the modest increase in cotton yarn exports and stable cotton textile exports after the policy reform, the total value of exports of the entire cotton sector will increase, though not to a large extent.

Table 16: Changes in Export Values

		Case 1	Case 2	Case 4	Case 8
Policy Changes	Export Policy	No export quotas			
	Hank Yarn Obligation	50%	None	50%	None
	Compensatory Policies	None	None	No tax (weaver)	Producer subsidy (weaver) and yarn consumer subsidy (handloom)
Export Value Changes	Cotton	+44 %	+37 %	+44 %	+37 %
	Yarn	+2 %	+7 %	+2 %	+3 %
	Textile	-1 %	-2 %	+1 %	+2 %
	Total	+2 %	+2 %	+3 %	+4 %

Financial Cost of the Compensatory Scheme

Compared to its modest impacts on exports, the financial costs of the liberalization-cum-compensation will be a matter of greater concern for the government. If direct subsidies are not provided to textile weavers, the government can still run a budget surplus in the cotton sector without levying producer tax (Cases 3 and 4 in Table 17). However, as apparent from the previous analysis, handloom weavers will not be relieved by such compensation schemes without direct subsidies, as their net income will decline by 7 to 11 per cent (Table 14). In other words, this level of compensation is not enough for handloom weavers, even if the hank yarn obligation is still enforced.

Table 17: Changes in Government Revenue - Tax Exemption for Weavers (Rs. million per year)

	Case 3		Case 4		Case 5	
Export Liberalization	No export quotas					
Hank Yarn Obligation	50%		None			
Cotton Consumer Tax on Mills	4,225	(+489)	4,242	(+506)	4,242	(+506)
Yarn Consumer Tax on Weavers	4,100	(-2,591)	4,224	(-2,467)	4,224	(-2,467)
Cone Yarn Subsidy for Handlooms	0	(0)	0	(0)	-4,496	(-4,496)
Textile Producer Tax on Weavers	0	(-4,229)	0	(-4,229)	0	(-4,229)
Textile Producer Subsidy for Weavers	0	(0)	0	(0)	0	(0)
Total Revenue	8,325	(-6,330)	8,467	(-6,189)	3,970	(-10,685)

(): Change from the present revenue. For example, in Case 3, yarn consumer tax will decrease from the present level of Rs.6,691 million to Rs.4,100 million per year. The difference is Rs.2,591 million.

When both the export quotas and the hank yarn obligation are removed, the level of the government deficit needed to fully compensate the powerloom weavers' losses is Rs.2,989 million (US\$62 million) (Case 7 in **Table 18**). Further, in order to compensate the losses of handlooms, the government will have to spend Rs.2,256 million (US\$47 million) for handloom subsidies annually (Case 8 in **Table 18**). While the textiles producers receive subsidies, cotton farmers will not be taxed to balance the budget, because taxing the farmers, who are politically strong, is nearly impossible. As a result, in order to make no one worse off, the total annual government deficit in the cotton sector will be Rs.5,246 million (US\$109 million), compared to the present annual revenue of Rs.15,050 million (US\$313 million) with a difference of Rs.20,296 million (US\$423 million), an amount little over 25 per cent larger than the current government revenue in the Indian cotton sector. If we take the administrative costs into account, this level of the government expenditure will become even larger; the entire cost could be nearly US\$500 million.

Table 18: Changes in Government Revenue - Producer Subsidy for Weavers (Rs. million per year)

	Case 6		Case 7		Case 8	
Export Liberalization	No export quotas					
Hank Yarn Obligation	50%		None			
Cotton Consumer Tax on Mills	4,224	(+488)	4,241	(+505)	4,241	(+505)
Yarn Consumer Tax on Weavers	4,112	(-2,579)	4,238	(-2,453)	4,238	(-2,453)
Cone Yarn Subsidy for Handlooms	0	(0)	0	(0)	-2,256	(-2,256)
Textile Producer Tax on Weavers	0	(-4,229)	0	(-4,229)	0	(-4,229)
Textile Producer Subsidy for Weavers	-11,469	(-11,469)	-11,469	(-11,469)	-11,469	(-11,469)
Total Revenue	-3,132	(-17,788)	-2,989	(-17,645)	-5,246	(-20,296)

How Realistic Is the Compensation Scheme?

The simulation is useful to quantify the impacts of the liberalization, especially the income losses of the handloom weavers. It is also helpful to know the level of the government spending needed to compensate them. What needs to be examined next is whether such a compensatory scheme is administratively feasible, and whether such a costly scheme is politically desirable in the long-run. In answering these questions, there are at least four factors to consider.

First, it is very difficult to reach all the 6 million handloom weavers, who are scattered all over the country. In fact, there are many reports which reveal that the past handloom protection programs have been far from successful in India for this reason. The survey conducted by the Institute of Rural Management, Ahmedabad (IRMA, 1989), for example, revealed that only 29 per cent of the handlooms actually benefited from the state intervention. Secondly, if we take the high level of administrative costs, which are not included in the simulation analysis, into account, the financial cost of the government subsidies will become even larger. Thirdly, the problem of camouflaged handlooms by powerloom weavers would become an even more serious matter. Lastly, the more subsidies are provided, the more serious corruption will be. Direct subsidy that was proposed in the previous analysis can create new vested interests, and this will, in turn, make the future reform even more difficult. Are there any other politically desirable policy options, rather than the direct subsidy program? The next chapter will examine the issue.

CHAPTER 5

POLITICALLY FEASIBLE REFORM

5.1. POLITICAL FEASIBILITY OF LIBERALIZATION

Removal or Relaxation of Cotton Export Quota?

Although they look similar, the political impacts of complete liberalization of cotton exports, relaxation of the current export quota, and replacement of export quota by export tariffs are all different. The reason behind this is apparent if we examine who captures the economic rents under each export policy. Under the current system, the rents are captured by public cotton traders, who are supposed to rebate the profit to farmers. That is one of the reasons why farmers have accepted the cotton export restriction scheme. This benefit for farmers will be maintained by the relaxation of cotton export quotas, but not by the removal of the quotas or replacement by taxation. The detailed examination on potential gains and losses of each interest group under the different processes of cotton export liberalization will make the political economy picture clearer. Based on the analysis, various ways of liberalization will be compared from the viewpoint of political economy, and the most desirable reform policy will be proposed in this chapter.

There are five ways of cotton export liberalization. (A) The first way is to increase export quota allocation to each trader proportionally. Here, the present decision-making scheme over cotton exports itself remains the same. (B) Second, while export restrictions are still made by quota, it is not allocated by the government but is auctioned in an open bidding market, where any public and private trader can participate. There are two other gradual reform paths. (C) Export quota is removed only for long-staple cotton. (D) The quota restriction for all the cotton exports is replaced by export taxation. (E) The last one is the most drastic approach, where the entire cotton export restriction scheme is abolished so that any cotton can be exported freely. **Table 19** compares the impacts of these five different liberalization policies on each group.

Table 19: Gainers and Losers Under Different Liberalization Policies

	(A) Relaxation of Nationwide Quota	(B) Still Quota But All Open Bidding	(C) Free Exports of Long-Staple Cotton	(D) Replace by Export Taxation	(E) Completely Free Cotton Exports
Cotton Farmers	O	□	O	X	X
Public Traders	O	X	O	X	X
Private Traders	O	O	O	O	O
Spinning Mills	X	-	-	-	X
Powerlooms	X	-	-	-	X
Handlooms	X	-	-	-	X
Bureaucrats	-	X	-	□	X

O: gain, X: loss, -: indifferent, □: depends upon the situation

As nationwide quotas are relaxed, cotton farmers and traders will naturally benefit while mills and weaving sectors will lose in (A). The impact differs in (B), where all the quotas are auctioned in the market, rather than allocated by the government. Obviously private traders will be the major beneficiaries, while most public exporters are most likely to lose. The impacts on farmers are ambiguous; many of them will complain in the beginning as their state associations are no longer able to export. However, in the long-run, more efficient private exporters, who replace the public exporters who have often failed to capture export opportunities in the past, will benefit farmers, especially if the economic rent is captured and redistributed to the society. One of the key issues for consideration in liberalizing cotton exports is public sector rent-seeking. If the government liberalizes cotton exports by phasing out the export quota, public traders will strongly appeal, because they will not be able to compete with efficient private traders for cotton exports in the open market.

In contrast, the free export of long-staple cotton would be politically most acceptable, because it would have smaller adverse impacts to losers, as shown in (C) in **Table 19**. Public traders would lose, but to a much smaller extent than case (B), because the proportion of sales from long-staple cotton exports is relatively small for them. The impacts on mills, powerlooms and handlooms would be much smaller than other cases, because of the present misallocation of cotton varieties as analyzed in the previous chapter.

The replacement of export quota by taxation would also have little impacts on mills and weavers. However, it would still act as a disincentive mechanism for cotton producers. Normally the replacement of export quotas by export taxation is desirable, as the latter is more transparent, and more consistent. However, in this case, the reform would be difficult to implement. As explained in the previous chapter,

cotton farmers are rebated economic rents captured by public exporters in India. If farmers are taxed for cotton exports instead and no economic rent is rebated by public traders, exporting cotton farmers will vehemently resist export taxation. Their resistance would be also harmonized by the public traders' political activities. It would be very difficult for the government to persuade them that the export tax revenue, which is an economic rent captured not by public traders but by the government, will be eventually rebated to the society through the government channel. Considering the strong political presence of farmers in India, this policy would be difficult to implement.

Lastly, complete liberalization would lead to both farmers and private traders making profits. The effects on public traders are ambiguous, as in the case of policy (C). The impacts on mills, powerlooms, and in particular handlooms are serious, as computed in the simulation model in the previous chapter. Hence, this policy (E) is unable to be accepted as already argued.

Deregulating Long-Staple Cotton Exports

Hence, it seems that the most realistic policy option is to deregulate only long-staple cotton exports in the first stage. On top of the political acceptability as analyzed above, the potential of long-staple cotton exports is promising in the world market. While exporting more long-staple cotton to earn foreign exchange outside the quota, India can even import short-staple cotton if it is needed. This will not only make the reform process politically easier but also correct the prevailing resource misallocation of cotton varieties in India. Over the period, the government can increase the staple varieties of cotton that are not subject to export quotas. It is also worth considering a cotton export-oriented unit (EOU) scheme as a separate export track of long-staple cotton.¹² It is expected that the exports from cotton EOUs will undermine the export quota policy.

Timing of the Liberalization

The timing of export liberalization also matters. The right time to deregulate cotton exports depends upon the movements of the international price and domestic price of cotton, which are not always linked with each other. If the export quota is relaxed when the gap between the Indian price and the world price is small, the impact is also limited. For example, although the central government announced a sizable cotton export quota in 1995/96, it had little impact on the domestic cotton prices. In addition, if the extra quota is allocated at the very end of the cotton year, even efficient private exporters will find it difficult to find overseas

¹² As pointed out by Misra (1993), the law on ownership of agricultural land, which does not permit individual land holdings exceed certain limits, should be modified to make large-scale cotton EOUs legally permitted in India.

buyers, so the domestic cotton price would not increase.

The effect of cotton export liberalization also depends on the domestic cotton demand, which is determined by the situation of the domestic mills. In a year when the situation of mills is not as good as in previous years, the domestic price of cotton tends to go down, as the demand for cotton is weak, even if the export quota is relaxed. Thus, the ideal time to liberalize cotton exports is when the impact on the domestic cotton price is limited and resistance from affected interest groups is small.

5.2. MOBILIZING THE POLITICAL POWER STRUCTURE

Spinning Mills' Involvement in Cotton Production

While the right path and timing of reform is important, it is also desirable to promote supplementary policies that can mobilize the political structure among interest groups. One such possible policy would be to encourage the mill sector's involvement in the cotton production. Everyone agrees that had India produced more cotton, the political conflicts over cotton exports would have been less serious. As it is difficult to further increase the cultivated area for cotton, a common interest for farmers, mills, powerlooms, and handlooms is growth in cotton yields. Considering that mill owners have more capital, it would be possible for them to develop high-yield cotton seeds and enhance modern agricultural management in collaboration with farmers. Already, some mill owners such as Arvind started to invest in cotton cultivation. The ICMF also started to get involved in cotton production in collaboration with the CCI and the EICA.¹³ The Government can encourage more of this type of collaboration, which will reduce the political conflicts over cotton export policy between different groups.

Not only the backward integration (mills' involvement in cotton production) but also the forward integration (cotton trader's involvement in cotton spinning) will strengthen the cooperation between the different interest groups. It is desirable that the government provides assistance to the spinning mills, farmers, traders, and ginneries who are willing to participate in the improvement of cotton yield by forward and backward integration, which will lead to minimizing the political conflicts over cotton exports.

Handloom Conversion Program

¹³ ICMF's Cotton Development and Research Association as a joint venture for cotton development and sales is an example of the alliance among different interest groups - public traders, private traders and mills. Under the scheme, the CCI requests the EICA to extend its support while selling ready bales to their mill buyers on an assurance that the CCI will not approach such mills directly.

Considering the serious impacts of hank yarn liberalization on handloom weavers, efforts to convert them to the powerloom sector are very important. Fortunately the number of weavers who have converted from handloom to powerloom has increased in recent years. The switch has resulted in an overall increase in income of weavers, because of the difference in productivity. Tamil Nadu is particularly successful in terms of handloom conversion. It was the first state where co-operative societies for handlooms started to develop, and handloom conversion programs were promoted under their initiatives. In order to encourage the handloom weavers to join co-operative societies, the state government provided subsidized loans for co-operative societies to finance their working capital and for handloom weavers to acquire the share capital of co-operatives in their area.

It should be kept in mind, however, that not all the handloom conversion programs were successful in India. For example, in the 1950s, the central government initiated a program to convert handlooms to powerlooms. However, the premature conversion program did not work out because master weavers, who were afraid of their contract handloom weavers, urged them not to convert (Uchikawa, 1998). Besides, many individual handloom weavers themselves were hesitant to convert because of the fear that some of them might lose their employment. Another unsuccessful case was reported by Das (1986), where a lack of many factors, such as working capital, co-ordinated efforts in maintaining a regular flow of raw cotton and other inputs, finishing and marketing facilities, as well as working knowledge and management in the society level, led to the eventual failure of the government's handloom conversion program in Assam.

Politically, if powerloom machines are freely provided to handloom weavers who are willing to convert to powerloom operators, the handloom conversion program will be supported by the textile machinery industry, as their sales will increase. This is another type of desirable political alliance between different interest groups towards a common productive objective. It should be noted that this is only when new powerlooms are provided to handloom weavers; otherwise, the sales of machinery industry will not increase because powerlooms are manufactured by small-scale engineering firms as copies of simple available looms or simply purchased as second hand looms from closing composite mills.

Diversifying Handloom Weavers' Activities

While promoting handloom conversion programs, diversifying inputs and outputs of handloom weavers should also be encouraged. Although not very rapid, the diversification of handloom inputs from cotton yarn to other types of yarn has been a nationwide phenomenon. Compared to the fact only 1 per cent of the handloom cloth was 100 per cent non-cotton products in the beginning of nineties, the fraction increased to 7 per cent by 1994/95 (Office of the Textile Commissioner, 1995). In the future, programs to encourage more

handloom weavers to process larger amounts of man-made yarn, blended yarn and silk yarn will make it easier for the government to liberalize the cotton sector in India. Further, such programs will be supported by the man-made yarn industry, as their sales will increase as a result.

Also important in diversification is the nature of output of the handloom industry. It would be meaningful to help the industry to diversify from low-quality cotton fabric to such design items as luxurious saris, shawls, and curtains. This will not only increase the income of handloom weavers but also make them less affected by the fluctuations of cotton and yarn prices. In order to increase their sales of the high-value products, training programs in effective marketing should also be conducted.

Thirdly, it would be desirable to help handloom weavers take up more side jobs. It is estimated that half of the handloom weavers are part-time workers in India (Office of Textile Commissioner, 1995).¹⁴ There is a need to promote training programs that help more handloom weavers shift their daily working activities to other more productive jobs. Also, considering the comparatively high rate of female workers in the handloom sector, the importance of educating handloom workers is even more apparent, as it increases the role of women in the Indian society.

Lastly, the importance of child education in the handloom sector should be mentioned. In handlooms, it is family labor, including female adults and children, who are all involved in some capacity, as pointed out by Chaudhuri (1994). Because of the lack of education, poor nutrition and cramped working conditions, children in the handloom sector are often not suited for other kinds of labor when they grow up. They must be taken out of the vicious cycle, which can be done by providing free schooling and nutritious meals at school. The successful combination of the programs proposed in this section - handloom conversion programs, input and output diversification programs, part-time job training programs, and children education programs - will be much healthier than simply providing direct subsidy coupons to handloom weavers for years on end.

¹⁴ In particular, the majority of handloom weavers in Assam are non-commercial female workers who work on a part-time basis at home and produce cotton textiles primarily for their own domestic use (Das, 1986).

CHAPTER 6

CONCLUSION

The case study of the Indian cotton export policy has suggested that negative consequences of commodity export restriction are more serious than generally thought. This paper first identified three economic problems: lack of incentive for farmers, resource misallocation, and slow administration of the government sector. As shown in the Indian case, the incentive problem, where a price disincentive factor for farmers can reduce output, could cause an input availability problem for downstream industry in the long-run. The resource misallocation can be serious not only between different sectors, such as the agricultural sector and the manufacturing sector (as taught by basic economic theory), but also within the agricultural sector. Every commodity has different varieties, such as long-staple cotton and short-staple cotton. Since the government can hardly forecast changes in demand for and supply of each variety in a flexible way, a uniform export quota tends to cause a mismatch of varieties in the domestic market. This problem can be called intra-industry resource misallocation, in contrast to the more familiar inter-industry resource misallocation. The slow and inefficient government administration is also serious. There is a season of harvest for each commodity, and ideal timing to make export contracts with overseas buyers is very important in today's competitive world commodity market. Since the procedure to decide export quotas tends to be time consuming, traders often fail to capture exporting opportunities. Efficiency of public exporters is another concern. Since export quotas are accompanied by economic rents, governments tend to assign public traders to monopolize exports. However, exporting is easier said than done; some of the public exporters cannot find suitable overseas buyers. Hence some quotas go unfilled, and the economic rent is not fully captured.

This paper then revealed that political problems of export quota can be even more serious than these economic problems. One of the reasons that many governments tend to prefer export quotas to export taxation is that a quota level is easier to change than export tax rates, should market conditions change. However, the flexibility of the control actually facilitates rent-seeking activities. Since quota is more frequently revised than tax rates, interest groups are more involved in lobbying activities. Assigning export entitlements to public traders does not solve the rent-seeking problem. It was suggested from the Indian case that public rent-seeking is sometimes even more difficult to resist for the government. Manipulation of crop statistics is another serious problem. Since the levels of export quotas are usually based on an official meeting of concerned groups, each interest group tries to influence the level of national export quota by padding crop estimations. Consequently, the whole official crop statistics tend to be unreliable. In the end,

export quotas cannot be more than an outcome of a political arena; it is decided erratically and inconsistently, and influenced by short-term political interests. There is a vicious circle; export quotas are announced in an *ad hoc* way; price fluctuation follows, speculative commodity trading is induced, interest groups become more involved in lobbying activities, and export policy becomes even more susceptible to politics.

Thus, the need for future liberalization in the Indian cotton sector is apparent. However, in the past, efforts to measure the effects of liberalization, in particular the potential income loss of handloom weavers has not been made in India. In this paper, a multi-market model was constructed for simulation. The model is the first multi-market model where price elasticities are computed endogenously, based upon the ratios between product prices and input costs. Another innovation of the multi-market model constructed here is its attempt to distinguish short-run effects from long-run effects, based on the economic principle that capital cost is variable only in the long-run. Although this model was developed to analyze the Indian cotton sector, it is easy to use the model to simulate other vertically integrated sectors, where a primary commodity is not only exported but also supplied to the domestic manufacturing industry, without significant change of model specification. Since the model requires neither intensive data collection nor cumbersome elasticity estimates and simulation results are easy to interpret, it is convenient for policymakers to conduct quick simulations when they attempt to initiate policy reforms.

Based on the results of the numerical simulation, this paper concluded that it is not politically feasible to remove export restrictions of cotton overnight. It was also suggested that replacement of export quotas by export taxation is not a very feasible option. Instead, this paper suggested to remove export quotas for long-staple cotton in the first stage of the reform, and gradually increase the varieties of cotton that are not subject to export quota restriction. It was also proposed that in the meantime, a number of reforms, such as the mill sector's involvement in cotton cultivation and handloom conversion programs, should be promoted in India. In many countries, liberalization programs have been unsuccessful because of their neglect of domestic political factors. Both political structure and government policy are endogenous to the society in any country. It is crucial to consider how the policy change will affect the political power structure and the objectives of each interest group. A wise policy reform aims at making interest groups concentrate on efficient and productive activities by transforming one group to the other and enhancing politically desirable alliances among different groups.

APPENDIX A

TECHNICAL NOTES ON THE ELASTICITIES FOR THE MODEL

This appendix shows the mathematical relations among the price elasticities used in the simulation model. As shown in the two tables below, there are twenty elasticities for India in total. For example, ⑤ is the short-term supply elasticity of yarn with respect to cotton price, and ⑤ is the long-term supply elasticity of yarn with respect to cotton price.

Table 20: Short-term and Long-term Elasticities

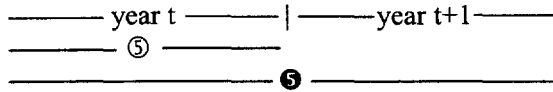
(A) Short-term Elasticities (India)

Elasticity for \ w.r.t.		P_C	P_Y	P_T
Farmer	S_C	①		
Spinning	D_C	②	③	
Mill	S_Y	④	⑤	
Textile	D_Y		⑥	⑦
Weaver	S_T		⑧	⑨
Consumer	D_T			⑩

(B) Long-term Elasticities (India)

Elasticity for \ w.r.t.		P_C	P_Y	P_T
Farmer	S_C	①		
Spinning	D_C	②	③	
Mill	S_Y	④	⑤	
Textile	D_Y		⑥	⑦
Weaver	S_T		⑧	⑨
Consumer	D_T			⑩

where S_C = Cotton Supply, D_C = Cotton Demand, S_Y = Yarn Supply
 D_Y = Yarn Demand, S_T = Textile Supply, D_T = Textile Demand
 P_C = Cotton Price, P_Y = Yarn Price, P_T = Textile Price



⑤ short-term elasticity, ⑤ long-term elasticity

In the following, it is proven that if we know the value of ⑤, then it is possible to compute the values of ②, ③, ④, ②, ③ and ④. Similarly, if the value of ⑨ is given, then it is possible to estimate the values of ⑥, ⑦, ⑧, ⑥, ⑦ and ⑧. Thus, all of the twenty elasticities can be grouped into four independent sets - {①, ①}, {②, ③, ④, ⑤, ②, ③, ④, ⑤}, {⑥, ⑦, ⑧, ⑨, ⑥, ⑦, ⑧, ⑨} and {⑩, ⑩}. This means, for example, ② and ④ are dependent with each other, while ② and ⑥ are independent from each other.

(1) Ratio Among Elasticities and Cost Share

This section first shows that the ratio among the absolute values of price elasticities for a producer is the same as the cost share. For example, if the cost share of cotton is 60 per cent for spinning mills, then the absolute value of demand elasticity of cotton yarn with respect to cotton price for them is 60 per cent of the supply elasticity of cotton yarn with respect to cotton yarn price. Similarly, suppose there are two inputs - cotton (60 per cent of the total cost) and another input, say labor, (40 per cent of total cost) - for spinning mills to produce cotton yarn, then the supply elasticity of cotton yarn with respect to cotton yarn price is 1.5 times (since $0.6 / (1 - 0.6) = 1.5$) as much as the supply elasticity of cotton yarn with respect to the price of another input both in absolute values.

Suppose a spinning mill's problem is:

$$\text{Max } pf(c,x) - p_c c - p_x x$$

where p = output price (i.e., price of cotton yarn)
 f = production function (i.e., yarn production function)
 Y = output (i.e., supply of yarn)
 c = input demand (i.e., demand of cotton)
 p_c = input price (i.e., price of cotton for spinning mill)
 x = another input demand (i.e., demand of non-cotton input)
 p_x = another input price (i.e., price of non-cotton input)

Differentiating both by c and by x , we have

$$pf'_c = p_c \tag{1}$$

$$pf'_x = p_x \tag{2}$$

At the optimal level,

$$Y^* = f^*(c^*, x^*).$$

Now we need to compare the supply elasticity of yarn with respect to yarn price and supply elasticity of yarn with respect to cotton price for spinning mills. In the following, dY/dp and dY/dp_c are computed, and then it is shown that the ratio between the two elasticities - $\{(dY/dp)/Y/p\} / \{(dY/dp_c)/Y/p_c\}$ - equals the cost share of cotton.

$c, x; p$ for cotton yarn price

Differentiate the equation (1) with respect to p .

$$f'_c + pf_{cc}dc/dp + pf_{cx}dx/dp = 0 \tag{3}$$

Differentiate (2) with respect to p_c .

$$f'_x + pf_{xc}dc/dp + pf_{xx}dx/dp = 0 \tag{4}$$

From (3) and (4),

$$dc/dp = (-f_c - pf_{cx}dx/dp) / pf_{cc} = (-f_x - pf_{xx}dx/dp) / pf_{xx}. \quad (5)$$

$$f_x + pf_{xc} \{(-f_c - pf_{cx}dx/dp) / pf_{cc}\} + pf_{xx}dx/dp = 0$$

$$(pf_{xx} - pf_{cx}^2/f_{cc})dx/dp = f_{xc}f_c/f_{cc} - f_x \\ dx/dp = (f_{xc}f_c/f_{cc} - f_x) / \{p(f_{xx}f_{cx}^2/f_{cc}) = (f_{cx}f_{cx} - f_{cc}f_x) / p(f_{cc}f_{xx} - f_{cx}^2)\} \quad (6)$$

From (5) and (6),

$$dc/dp = [-f_x - \{pf_{xx}(f_{cx}f_c - f_{cc}f_x)\} / \{p(f_{cc}f_{xx} - f_{cx}^2)\}] / pf_{xc} \\ = -f_x / pf_{cx} - [f_{cx}f_{xx} / \{pf_{cx}(f_{cc}f_{xx} - f_{cx}^2)\}] + [f_{cc}f_{xx}f_x / \{pf_{cx}(f_{cc}f_{xx} - f_{cx}^2)\}] \\ = \{-f_x(f_{xx}f_{cc} - f_{cx}^2) - f_{cx}f_{xx} + f_{cc}f_{xx}f_x\} / \{pf_{cx}(f_{cc}f_{xx} - f_{cx}^2)\}$$

$$dc/dp = \{-f_{xx}(f_{cc}f_x + f_{cx}^2) + f_x(f_{cx}^2 + f_{cc}f_{xx})\} / \{pf_{cx}(f_{cc}f_{xx} - f_{cx}^2)\} \quad (7)$$

From (5), (6) and (7),

$$dY/dp = f_c dc/dp + f_x dx/dp \\ = [\{-f_{xx}(f_{cc}f_x + f_{cx}^2) + f_{cx}^2(f_{cx}^2 + f_{cc}f_{xx})\} / pf_{cx}(f_{cc}f_{xx} - f_{cx}^2)] + \{(f_{cc}f_x - f_{cx}^2) / p(f_{cc}f_{xx} - f_{cx}^2)\} \\ = \{f_{cx}(f_{cc}^2f_{xx} + f_{cc}f_{cx}^2 - f_{cc}f_{xx}^2) - f_{cc}f_{cx}^2\} / \{pf_{cx}(f_{cc}f_{xx} - f_{cx}^2)\}$$

$$dY/dp = (-f_c^2f_{xx} + 2f_{cc}f_{cx} - f_{cc}f_{xx}^2) / \{p(f_{cc}f_{xx} - f_{cx}^2)\} \quad (8)$$

$c_x, x; p_c$ for cotton price

Differentiate (1) with respect to p_c ,

$$pf_{cc}dc + pf_{cx}dx = dp_c \quad (9)$$

Differentiate (2) with respect to p_c ,

$$pf_{cx}dc + pf_{xx}dx = 0 \quad (10)$$

From (10),

$$dc/dx = -f_{xx} / f_{cx}$$

$$f_{cc}dc/dp_c + f_{cx}dx/dp_c = 1/p$$

$$dx/dp_c = (1/p - f_{cc}dc/dp_c) / f_{cx} \quad (11)$$

$$(dc/dx)(dx/dp_c) = dc/dp_c$$

$$-(f_{cc}f_{xx} / f_{cx}) dc/dp_c + f_{cx}dc/dp_c = -f_{xx} / pf_{cx}$$

$$dc/dp_c (f_{cx}^2 - f_{cc}f_{xx}) = -f_{xx} / pf_{cx}$$

$$dc/dp_c (f_{cx}^2 - f_{cc}f_{xx}) = -f_{xx} / p$$

$$dc/dp_c = f_{xx} / \{p(f_{cc}f_{xx} - f_{cx}^2)\} \quad (12)$$

From (11) and (12),

$$dx/dp_c = [1/p - f_{cc}\{f_{xx} / p(f_{cc}f_{xx} - f_{cx}^2)\}] / f_{cx} \\ = \{f_{cx}(f_{cc}f_{xx} - f_{cx}^2) - f_{cc}f_{cx}f_{xx}\} / \{pf_{cx}(f_{cc}f_{xx} - f_{cx}^2)\}$$

$$dx/dp_c = -f_{cx} / \{p(f_{cc}f_{xx} - f_{cx}^2)\} \quad (13)$$

From (12) and (13),

$$\begin{aligned}
dY/dp_c &= f_c dc/dp_c + f_x dx/dp_c \\
&= f_c f_{xx} / \{p(f_c f_{xx} - f_{cx}^2)\} - f_x f_{xc} / \{p(f_c f_{xx} - f_{cx}^2)\} \\
dY/dp_c &= (f_c f_{xx} - f_{cx} f_x) / \{p(f_c f_{xx} - f_{cx}^2)\}
\end{aligned} \tag{14}$$

Compare (dY/dp)/(Y/p) and (dY/dp_c)/(Y/p_c)

From (8) and (14),

$$\begin{aligned}
&\{(dY/dp)/(Y/p)\} / \{(dY/dp_c)/(Y/p_c)\} \\
&= \{(dY/dp_c)/(Y/p_c)\} / (p_c/p) \\
&= [p(-f_c^2 f_{xx} + 2f_c f_{cx} f_x - f_{cx}^2 f_x^2) / \{p(f_c f_{xx} - f_{cx}^2)\}] / [p_c(f_c f_{xx} - f_{cx} f_x) / \{p(f_c f_{xx} - f_{cx}^2)\}] \\
&= \{p(f_c^2 f_{xx} + 2f_c f_{cx} f_x - f_{cx}^2 f_x^2) / \{p_c(f_c f_{xx} - f_{cx} f_x)\}\} \\
&= \{p(-f_c^2 f_{xx} + 2f_c f_{cx} f_x - f_{cx}^2 f_x^2) / [p f_c(f_c f_{xx} - f_{cx} f_x)]\}
\end{aligned}$$

Thus, we have

$$\{(dY/dp)/(Y/p)\} / \{(dY/dp_c)/(Y/p_c)\} = (-f_c^2 f_{xx} + 2f_c f_{cx} f_x - f_{cx}^2 f_x^2) / \{f_c(f_c f_{xx} - f_{cx} f_x)\} \tag{15}$$

Long-term Elasticities with Variable Capital

Assume the production function of spinning mills to be a Cobb-Douglas type as follows.¹⁵

$$Y = f(c, x) = A c^\alpha x^\beta$$

where Y = output of cotton yarn

c = input of cotton

x = another input

$$\alpha < 1, \beta < 1$$

By differentiating the above production function, we have

$$f_c = A \alpha c^{\alpha-1} x^\beta \tag{16}$$

$$f_x = A \beta c^\alpha x^{\beta-1} \tag{17}$$

$$f_{cc} = A \alpha(\alpha-1) c^{\alpha-2} x^\beta \tag{18}$$

$$f_{xx} = A \beta(\beta-1) c^\alpha x^{\beta-2} \tag{19}$$

$$f_{cx} = A \alpha \beta c^{\alpha-1} x^{\beta-1} \tag{20}$$

From (15), (16), (17), (18), (19) and (20), we can compute

$$\begin{aligned}
&\{(dY/dp)/(Y/p)\} / \{(dY/dp_c)/(Y/p_c)\} \\
&= [(-\alpha^2 c^{2\alpha-2} x^{2\beta}) \{(\beta(\beta-1) c^\alpha x^{\beta-2}) + 2\{(\alpha c^{\alpha-1} x^\beta)(\beta c^{\alpha-1} x^{\beta-1})\} - \{\alpha(\alpha-1) c^{\alpha-2} x^{2\beta}\}(\beta^2 c^{2\alpha} x^{2\beta-2})\}] \\
&\quad / [(\alpha^2 c^{2\alpha-2} x^{2\beta}) \{\beta(\beta-1) c^\alpha x^{\beta-2}\} - (\alpha c^{\alpha-1} x^\beta)(\alpha \beta c^{\alpha-1} x^{\beta-1})(\beta c^\alpha x^{\beta-1})]
\end{aligned}$$

$$\begin{aligned}
&\{(dY/dp)/(Y/p)\} / \{(dY/dp_c)/(Y/p_c)\} \\
&= \{(-\alpha^2 \beta^2 c^{3\alpha-2} x^{3\beta-2}) + (\alpha^2 \beta c^{3\alpha-2} x^{3\beta-2}) + (2\alpha^2 \beta^2 c^{3\alpha-2} x^{3\beta-2}) - (\alpha^2 \beta^2 c^{3\alpha-2} x^{3\beta-2}) + (\alpha \beta^2 c^{3\alpha-2} x^{3\beta-2})\} \\
&\quad / \{(\alpha^2 \beta^2 c^{3\alpha-2} x^{3\beta-2}) - (\alpha^2 \beta c^{3\alpha-2} x^{3\beta-2}) - (\alpha^2 \beta^2 c^{3\alpha-2} x^{3\beta-2})\}
\end{aligned}$$

$$\begin{aligned}
&\{(dY/dp)/(Y/p)\} / \{(dY/dp_c)/(Y/p_c)\} \\
&= \{\alpha \beta(-\alpha \beta + \alpha + 2\alpha \beta - \alpha \beta + \beta)(c^{3\alpha-2} x^{3\beta-2})\} / \{(\alpha \beta(\alpha \beta - \alpha - \alpha \beta)(c^{3\alpha-2} x^{3\beta-2}))\}
\end{aligned}$$

¹⁵ Sastry (1984) also assumed the production function of the Indian spinning mill as a Cobb-Douglas type function.

$$= \{\alpha\beta(\alpha + \beta)(c^{3\alpha-2}x^{3\beta-2})\} / \{\alpha\beta(-\alpha)(c^{3\alpha-2}x^{3\beta-2})\}$$

$$= (\alpha + \beta) / (-\alpha)$$

$$\{(dY/dp_c)/(Y/p_c)\} / \{(dY/dp)/(Y/p)\} = -\alpha / (\alpha + \beta) \quad (21)$$

$$\{(dY/dp_x)/(Y/p_x)\} / \{(dY/dp)/(Y/p)\} = -\beta / (\alpha + \beta) \quad (22)$$

Since $\alpha / (\alpha + \beta)$ is the cost share of cotton for spinning mills to produce cotton yarn, it has been proven that the ratio of demand elasticity of cotton yarn with respect to cotton yarn price is exactly the same as the supply elasticity of cotton yarn with respect to cotton price (-1) over the cost share of cotton for spinning mills. Similarly, we can assume the production function of mills with three inputs as:

$$Y = f(c, K, L) = Ac^\alpha K^\beta L^\chi$$

where Y = output of cotton yarn

c = input of cotton

K = capital input

L = labor input

$\alpha < 1, \beta < 1, \chi < 1$.

It is easy to prove the following result in exactly the same way as the case of two inputs.

$$\{(dY/dp_c)/(Y/p_c)\} / \{(dY/dp)/(Y/p)\} = -\alpha / (\alpha + \beta + \chi) \quad (23)$$

$$\{(dY/dp_K)/(Y/p_K)\} / \{(dY/dp)/(Y/p)\} = -\beta / (\alpha + \beta + \chi) \quad (24)$$

$$\{(dY/dp_L)/(Y/p_L)\} / \{(dY/dp)/(Y/p)\} = -\chi / (\alpha + \beta + \chi) \quad (25)$$

The intuition here is that the larger the cost share of one particular input, the larger the absolute value of the supply output elasticity with respect to that input will be. For example, if cotton and labor consist of 60 per cent and 10 per cent of the production cost of cotton yarn respectively, then the supply elasticity of cotton yarn with respect to cotton price is six times as large as the supply elasticity of cotton yarn with respect to wage in the absolute value.

Finally, the relation between ② and ④ in Table 20 depends on α , and the relation between ③ and ⑤ depends on α and β for the two-input case, and on α, β and χ for the three-input case. Mathematically, ② = $\alpha \times$ ④. Also ③ = $\alpha \times$ ⑤ (for the two-input case) or ③ = $\alpha \times$ ⑥ (for the three-input case). (As a special case, if the production function of a spinning mill has constant returns to scale with respect to cotton (which means $\alpha = 1$), then ② = ④. Also, if the production function of a weaver has constant returns to scale with respect to yarn, then ⑥ = ⑧.

Short-term Elasticities with Fixed Capital

So far, capital cost was assumed to be variable. However, in reality, firms will not be able to adjust their capital investment in the short-run, although they can do so in the long-run. In that sense, the above

computations on the relations among elasticities are for long-term analysis. In the short-run, $\beta = 0$ and therefore the equations (23), (24) and (25) are rewritten as follows:

$$\{(dY/dp_c)/(Y/p_c)\} / \{(dY/dp)/(Y/p)\} = -\alpha / (\alpha + \chi) \quad (26)$$

$$\{(dY/dp_k)/(Y/p_k)\} / \{(dY/dp)/(Y/p)\} = -\beta / (\alpha + \chi) = 0 \quad (27)$$

$$\{(dY/dp_L)/(Y/p_L)\} / \{(dY/dp)/(Y/p)\} = -\chi / (\alpha + \chi) \quad (28)$$

Thus, the difference between short-term elasticities and long-term elasticities are obvious.

(2) Changes in the Elasticities Over The Time

The next question is how the supply elasticity of a commodity with respect to the price of that commodity will change over the years. Let us define the following three elasticities. The first one $[t-1, t]$, and the second one $[t, t+1]$ are short-term elasticities, and the third one $[t-1, t+1]$ is a long-term elasticity. The first one and the third one correspond to ① and ③ respectively (or ⑤ and ⑥, ⑨ and ⑩, or ⑪ and ⑫) in Table 20, but the second one $[t, t+1]$ does not correspond to any in the table. For simplicity of our discussion, we assume short-term elasticity is an elasticity over one year, and long-term elasticity is an elasticity over two years, as illustrated in the following.

$$\begin{array}{c} \text{————— year } t \text{ —————} | \text{ ————— year } t + 1 \text{ —————} \\ \text{————— } (dY/dp)/(Y/p) [t-1, t] \text{ ————— } (dY/dp)/(Y/p) [t, t+1] \text{ —————} \\ \text{————— } (dY/dp)/(Y/p) [t-1, t+1] \text{ —————} \end{array}$$

$(dY/dp)/(Y/p) [t-1, t], (dY/dp)/(Y/p) [t, t+1]$ short-term elasticities
 $(dY/dp)/(Y/p) [t-1, t+1]$ long-term elasticity

where:

$(dY/dp)/(Y/p) [t-1, t]$ = elasticity of supply with respect to output price for year t

$(dY/dp)/(Y/p) [t, t+1]$ = elasticity of supply with respect to output price for year $t+1$

$(dY/dp)/(Y/p) [t-1, t+1]$ = accumulative elasticity of supply with respect to output price from the beginning of year t till the end of year $t+1$.

$Y [t-1]$ = output for year $t-1$ (e.g. last year's output)

$Y [t]$ = output for year t (e.g. output from the beginning of year t to the end of year t)

$Y [t+1]$ = output for year $t+1$ (e.g. output from the beginning of year $t+1$ to the end of year $t+1$)

$\Delta Y [t-1, t] = Y [t] - Y [t-1]$

$\Delta Y [t, t+1] = Y [t+1] - Y [t]$

$\Delta Y [t-1, t+1] = Y [t+1] - Y [t-1] = \Delta Y [t-1, t] + \Delta Y [t, t+1]$

$p [t-1]$ = output price for year $t-1$ (e.g. output price at the end the last year)

$p [t]$ = output price for year t (e.g. output price at the end of year t)

$p [t+1]$ = output price for year $t+1$ (e.g. output price at the end of year $t+1$)

$\Delta p [t-1, t] = p [t] - p [t-1]$

$$\Delta p [t, t+1] = p [t+1] - p [t]$$

$$\Delta p [t-1, t+1] = p [t+1] - p [t-1] = \Delta p [t-1, t] + \Delta p [t, t+1]$$

Compare $(dY/dp)/(Y/p) [t-1, t]$, $(dY/dp)/(Y/p) [t, t+1]$, and $(dY/dp)/(Y/p) [t-1, t+1]$

$$(dY/dp)/(Y/p) [t-1, t] = (\Delta Y [t-1, t] / \Delta p [t-1, t]) / (Y[t-1] / p [t-1]) \quad (29)$$

$$(dY/dp)/(Y/p) [t, t+1] = (\Delta Y [t, t+1] / \Delta p [t, t+1]) / (Y[t] / p [t]) \quad (30)$$

$$\begin{aligned} (dY/dp)/(Y/p) [t-1, t+1] &= (\Delta Y [t-1, t+1] / \Delta p [t-1, t+1]) / (Y[t-1] / p [t-1]) \\ &= \{(\Delta Y [t-1, t] + \Delta Y [t, t+1]) / (\Delta p [t-1, t] + \Delta p [t, t+1])\} / (Y[t-1] / p [t-1]) \\ &= \{\Delta Y [t-1, t] / (\Delta p [t-1, t] + \Delta p [t, t+1])\} / (Y[t-1] / p [t-1]) \\ &\quad + \{\Delta Y [t, t+1] / (\Delta p [t-1, t] + \Delta p [t, t+1])\} / (Y[t-1] / p [t-1]) \\ &= [(\Delta Y [t-1, t] / \Delta p [t-1, t])\{\Delta p [t-1, t] / (\Delta p [t-1, t] + \Delta p [t, t+1])\}] / (Y[t-1] / p [t-1]) \\ &\quad + [(\Delta Y [t, t+1] / \Delta p [t, t+1])\{\Delta p [t, t+1] / (\Delta p [t-1, t] + \Delta p [t, t+1])\}] \\ &\quad / [(Y[t] / p [t])\{(p [t] / Y [t])(Y [t-1] / p [t-1])\}] \end{aligned}$$

Define

$$A \equiv \Delta p [t-1, t] / (\Delta p [t-1, t] + \Delta p [t, t+1])$$

$$1 - A = \Delta p [t, t+1] / (\Delta p [t-1, t] + \Delta p [t, t+1])$$

$$B \equiv (Y [t-1] / Y [t]) / (p [t-1] / p [t])$$

$$(dY/dp)/(Y/p) [t-1, t+1] = A (dY/dp)/(Y/p) [t-1, t] + B (1 - A) \{(dY/dp) / (Y/p) [t, t+1]\} \quad (31)$$

Equation (31) implies that if $\Delta p [t, t+1]$ is zero, that is if the price of output does not change from year t to year $t+1$, then $(dY/dp)/(Y/p) [t-1, t+1] = (dY/dp)/(Y/p) [t-1, t]$, because $A = 1$ and $1-A = 0$. In other words, if the price at the end of year $t+1$ is the same as the price at the end of year t , then the two-year elasticity for year $t+1$ (i.e., $[t-1, t+1]$) is equal to the one-year elasticity (i.e., $[t-1, t]$). The intuition is that rational producers will increase their output elasticities when they expect the change in the coming new year. Suppose cotton yarn price is to increase for year $t+1$, spinning mills will try to be more flexible to increase their yarn output over the coming year $t+1$.

Looking back at the two tables at the beginning of this appendix, the relation between ⑤ and ⑥ depends on $\Delta p [t, t+1]$, which is the increase in yarn price from the end of year t to the end of year $t+1$. If the price does not increase over the year $t+1$ at all, then ⑤ = ⑥, which means the elasticity does not increase during the year. If the yarn price is to increase in year $t+1$, then ⑤ < ⑥, suggesting that the elasticity will increase during year $t+1$. Similarly, both the relations between ① and ② and between ⑩ and ⑪ can be computed from the change in cotton price and the change in textile price change respectively. Thus, all the elasticities are computed endogenously.

APPENDIX B

SENSITIVITY ANALYSIS UNDER DIFFERENT ELASTICITIES

Different Sets of Elasticities

The simulation model was run under four different sets of price elasticities for sensitivity analysis. Compared to the Base Set (which was used for the simulation in the main text), all the elasticities are halved in the Elasticity Set 1. Conversely, in the Elasticity Set 2, all of them are doubled. In the Elasticity Set 3, all the world elasticities are assumed to be equal to the equivalent Indian elasticities. All the elasticities in the four sets are as follows.

Table 21: Different Set of Elasticities for Sensitivity Analysis

Elasticities of	With respect to		Base Set	Set 1	Set 2	Set 3
Cotton Supply	Cotton Price	India	0.200	0.400	0.100	0.200
Cotton Demand	Cotton Price		-0.072	-0.144	-0.036	-0.072
Cotton Demand	Yarn Price		0.120	0.240	0.060	0.120
Yarn Supply	Cotton Price		-0.120	-0.240	-0.060	-0.120
Yarn Supply	Yarn Price		0.200	0.400	0.100	0.200
Yarn Demand	Yarn Price		-0.032	-0.064	-0.016	-0.032
Yarn Demand	Textile Price		0.080	0.160	0.040	0.080
Textile Supply	Yarn Price		-0.080	-0.160	-0.040	-0.080
Textile Supply	Textile Price	Rest of the World	0.200	0.400	0.100	0.200
Textile Demand	Textile Price		-0.100	-0.200	-0.050	-0.100
Cotton Supply	Cotton Price		0.133	0.267	0.067	0.200
Cotton Demand	Cotton Price		-0.048	-0.096	-0.024	-0.072
Cotton Demand	Yarn Price		0.080	0.160	0.040	0.120
Yarn Supply	Cotton Price		-0.080	-0.160	-0.040	-0.120
Yarn Supply	Yarn Price		0.133	0.266	0.067	0.200
Yarn Demand	Yarn Price		-0.021	-0.043	-0.011	-0.032
Yarn Demand	Textile Price		0.053	0.107	0.027	0.080
Textile Supply	Yarn Price		-0.053	-0.107	-0.027	-0.080
Textile Supply	Textile Price		0.133	0.267	0.067	0.200
Textile Demand	Textile Price		-0.067	-0.133	-0.033	-0.100

bold numbers are assumed exogenously, and the other numbers are computed endogenously.

Similar Results from Different Elasticities

There is no remarkable difference among the simulations under different elasticity sets. In particular, the income changes of handloom weavers and the government revenue, which are the most important factors to examine in this policy study, are almost the same in the sensitivity analysis (**Table 21**). This suggests the reliability of the simulation, because the results do not depend much upon the values of elasticities, which are given exogenously as they are very difficult to estimate accurately.

Table 22: Results of the Sensitivity Analysis Under Different Sets of Elasticities

			Base Set	Elasticity Sensitivity Analysis		
				Set 1	Set 2	Set 3
Case 1	Net Income Changes(%)	Cotton Farmer	15	18	13	16
		Spinning Mill	1	1	0	1
		Textile Weaver	-6	-6	-6	-6
		Powerloom	-3	-3	-3	-4
		Handloom	-12	-12	-12	-12
	Total	2	2	1	2	
Government Revenue (Rs. million)			15,439	15,419	15,449	15,497
Case 2	Net Income Changes(%)	Cotton Farmer	15	18	13	16
		Spinning Mill	15	17	13	15
		Textile Weaver	-8	-8	-7	-8
		Powerloom	-4	-5	-3	-4
		Handloom	-16	-17	-16	-16
	Total	2	3	2	2	
Government Revenue (Rs. million)			15,685	15,680	15,687	15,743

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